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*Illustrated.

George Westinghouse, whose fame is perhaps familiar to more of the readers of the *Railway Age Gazette* than that of any other man, is dead, at the age of 67. To those who knew him, except those nearby, who were well-informed, this is an untimely death, causing a great shock, for Mr. Westinghouse, though a prodigious worker, had an iron constitution and had appeared to be good for ten years more. He has been a chief and commanding figure in an era of the world's civilization characterized by unparalleled progress. As we are still surrounded by this rush of discoveries and inventions, it is perhaps too early to make a precise and final estimate of the character of so prolific an in-

The World's
Greatest
Railroad Engineer

ventor and genius; but we think it safe to say that he was the most renowned railroad engineer since George Stephenson. The perfecter of the locomotive did, indeed, launch the greatest material revolution of modern times; but the regulator throughout the world of the locomotive's activities—the air brake—will make real history in the mechanical world second in importance only to that which began with the Rocket in 1829; and Westinghouse's later achievements, though covering a wide range outside the field of transportation, will constitute a monument to the inventor in that field alone. An account of Mr. Westinghouse's career is given on another page.

In developing the "agency plan" on the Frisco, described elsewhere in this issue, the idea was more to place the railroad on the best and most businesslike basis with each community it served, rather than for any immediate financial returns which might result from the new arrangement. By making the agent a more important factor—in effect, making him the real representative of the railroad in his community—it should be possible to place the relations between the road and the public generally on a much more cordial basis than was true before this was done. In these days when the merchants cater to so great a degree to the comfort and convenience of their patrons, it behooves the railways and other public service institutions to give more attention to these things—those roads which have correctly read the signs of the times have already made much progress in this respect. Just as in the long run it will pay the merchant to follow this course, so it will pay the railroads. The agent, entirely responsible for the traffic in his section, as well as for his duties in the operating department, is necessarily much better informed as to the feelings of the public toward the railroad and can do much intelligent and effective work to set it right. At least one case is on record where a petition to the legislature which would have acted against the best interests of the railroad was recalled because of prompt action in getting in touch with the situation and showing those responsible for the action how injurious and unjust it would be to the railroads if persisted in.

Discipline of railroad employees is an interesting topic and articles recently published have aroused the interest of many readers. The two contributions which appear in this week's "Letters to the Editor," voice the views, we may be sure, of a large number of railroad officers. Indeed, the points made have been made before, and the propriety of printing these letters might seem questionable, were it not for this widespread interest. It is to be admitted that the knotty questions connected with the problem of suspending or not suspending, of being considerate or being severe, have to do with only a small portion of the force of men on any railroad which is reasonably well managed. It may also be admitted that superintendents who punish in anger or haste are not common. But this does not do away with the difficulty. There is another admission that may be made; punishment, *per se*, is legitimate. Those superintendents whom our correspondents ridicule as being too soft and womanish would be glad to employ legitimate punishments, if only they could find an acceptable way in which to do it. The trouble with suspensions is that, assuming that they constitute a good lesson for the person suspended, they demoralize his family and they give him an opportunity to demoralize his fellow employees. These two well-known and admitted facts tend powerfully to support the "Brown" view that the only man with whom it is fair to deal severely is the man whose quality is so hopeless that he ought to be discharged. And if he ought to be discharged, discharge him. "If a man is fit to work at all, he is fit to work all the time."

Discipline
Criticized as
Too "Soft"

In an interview given to the *Daily Railway Age Gazette* for March 18 President Willard, of the Baltimore & Ohio, discussed

**Mr. Willard on the
Rate Advance
Situation**

the present status of the eastern rate advance case. In substance Mr. Willard said that the railways have no criticism to make because the Interstate Commerce Commission is considering together the question of the advance in rates and the question of a charge for the so-called spotting of cars and so on. He called attention, however, to the fact that the plan apparently favored by Mr. Brandeis of enabling the carriers to secure additional net revenues by means of radical changes in present transportation practices has met with so much opposition from the shipping public that it would not be desirable even if it was feasible to carry it out immediately. He therefore contended that if the commission is convinced, as it appears to be, that eastern railways need additional revenue it should at once grant the increase in rates asked for by the railways and should subsequently make the thorough investigation of the practices now being criticised, which is prerequisite to a satisfactory determination of what action shall be taken regarding them. He pointed out that if the commission should later decide to authorize the railways to make charges for special services which would increase their revenues it could then make any reductions in rates which it might deem justifiable. The view expressed by Mr. Willard appears to be in the circumstances the only sensible one that can be taken and probably is shared not only by most railway men but also by most shippers who have considered the matter. As Mr. Willard points out, the need of railways for additional revenue is immediate and pressing; they cannot afford to wait indefinitely for relief. On the other hand, there is great merit in the contention of the shippers that no action such as that advocated by Mr. Brandeis should be taken without the business interests of the various communities being given an opportunity for full hearing. Manifestly the only way to give the railways what they are entitled to and at the same time give the shippers what they are entitled to is to give the railways now such rate advances as they need and then subsequently give the shippers full opportunity to be heard on the question of a charge for the spotting of cars and other related matters. It is to be hoped that the commission will perceive the logic of the situation as clearly as both the railway men and the shippers do and take prompt action accordingly.

The *Railway Age Gazette* has received a letter regarding the editorial in its last issue concerning the Chicago, Milwaukee &

**Cost of Labor
on the
St. Paul**

St. Paul accounting case from which we quote the following: "Weren't you nodding for a moment in your comment on the St. Paul case when you fell in with Commissioner Harlan's criticism of the alleged misstatement in regard to 'the great increase in the cost of labor'? If you will take a second glance at the figures you quote from the commissioner's opinion, you will see that the compensation of 48,083 employees in 1911 was within \$56,000 of the compensation paid 56,685 men in 1910. The average cost of the labor as shown in the same statement was \$2.27 per day in 1911 against \$2.23 in 1910, or 4 cents a day more. This means that the labor in 1911 for the men employed cost nearly \$2,000 a day more than it would have on the 1910 scale, or over \$600,000 for the year. The cost of labor is not determined by the aggregate, but by the unit. A reduction of 8,575 men in a working force which does not save more than \$56,000 in a year proves that the cost of labor has gone up and not down. If you were to discharge one-sixth of your editorial force and paid nearly as much to the remaining ten as you did to the original twelve, would you say the cost of editorial labor had gone up or down? I would say that your effort at economy had proved abortive, especially if either of the two let out was as good a man as any one of the ten retained." Our correspondent's reasoning is

sound as far as it goes. The figures certainly show an increase in the unit cost of labor, in consequence of which the St. Paul did not get as much labor in proportion to its total expenditure for labor in 1911 as in 1910. But in order that an increase in the unit cost of labor shall cause a reduction in net earnings it must cause an increase in the aggregate expenditure for labor; and this it did not do in this case, simply because the St. Paul reduced the number of its employees. However, the *Railway Age Gazette* regrets if it gave the impression that it took seriously the alleged "misrepresentation" by the Chicago, Milwaukee & St. Paul of its cost of labor. As our correspondent intimates, a railway management can hardly be severely criticized for making the statement that its cost of labor has increased when the figures show that it has cost it practically as much in one year to employ 48,000 men as it cost it in the year before to employ 56,700 men.

OFFENSIVE TREATMENT OF THE PUBLIC

THE great careless public is mighty particular about little things, often giving them an emphasis out of all proportion to their importance. On the other hand, some railroads are mighty careless about little things to which they might better give a very considerable amount of attention. If you were to visit a certain great resort in this country, of interest alike to American travelers and those from abroad, and which is advertised the world-over as one of our show places, you might be shocked at the observations made by the visitors in passing through the railway station. Not because the station is small and poorly lighted, although it is that, but because of its untidy appearance most of the time, and the apparent lack of interest on the part of those in charge of keeping it clean and neat. True the travelers are often careless in disposing of their papers, peanut shells, or the remains of lunch baskets; but it might almost be said that this carelessness was cultivated and inspired by the condition in which the station and the station grounds are kept. There are other stations just as well patronized, although possibly not so well advertised, in which one would never think of dropping or throwing such things on the ground, because of the neat and well kept surroundings; if it was done a porter would soon have them out of sight.

At one of our great seaside resorts and on a railroad which spends thousands of dollars each year in advertising its advantages and conveniences for the traveler, the following incident took place on a Saturday evening last summer. As darkness came on the earlier home-going crowd, largely parents with children and babies, was waiting for trains which were due to start homeward earlier in the evening, but for some cause or other had been delayed. It started to rain. The bulletin board gave no information of any value. Those in charge of the ticket office had practically nothing to do because most of the travelers were round-trippers. Four employees sat in this office chatting and otherwise enjoying themselves, but deaf to any inquiries concerning the trains. An officer—apparently the trainmaster—who was busy directing affairs in front of the station, was free for a moment or two. A well-dressed gentleman stepped up and asked for information as to the next train. Twenty people were listening anxious to hear the answer. There was none—the officer turned on his heel and walked away. Just what impressions will pass through the minds of several hundred people whenever they see the name of that particular road in an advertisement telling of its high grade and comfortable service?

At still another station on another road, three and a half hours by fast train from a great metropolis. Many business and professional men were waiting for an afternoon train which would get to the city in time for them to keep their evening engagements. The particular train they were waiting for was marked "on time." Seeing this men and women left their seats and stood in front of the gate waiting for it to be announced. Other trains were called, time passed, no change was made on the bulletin board, the announcer and the men at the gate looked wise,

gave off-hand answers to questions about the train, and chatted and joked among themselves. Forty-five minutes after it was due to leave the train came in and when it pulled out of the station nearly an hour late it was still marked "on time" on a handsome and expensive bulletin board. The president of the road or the general passenger agent would have been pained at the comments which were made if they could have heard them—they did not, however, seem to cause much anxiety to the station employees.

Knowing the public, as they should by this time, why do some of our great railroads allow such conditions to exist? Is it because there is a lack of efficient supervision? Are such things so common that those in authority fail to notice them? Is there no way in which the employees can be educated to the importance of treating the public courteously? Some one has said that the public cares more about being noticed than it does about the service which is given to it. Delays will happen on a railroad, and the public realizes this. What it objects to is being treated with indifference and lack of courtesy. It is a realization of the grave importance of making friends with the public and being careful in little things that has inspired the improvements in station service, and the dignifying and enlarging of the position of the agent on the St. Louis & San Francisco, as described elsewhere in this issue.

POSSIBILITIES OF LIGNITE AS FUEL

DURING the past year but little progress has been made developing the vast lignite resources of this country. A recent estimate made by the United States Geological Survey indicates that there are available 1,087,514,400,000 tons of lignite in the states of Arkansas, Montana, North Dakota, South Dakota and Texas. Five other states, Alabama, Louisiana, Mississippi, Tennessee and California, contain many valuable deposits, but sufficient data have not been obtained on which to base an estimate regarding the deposits in these states. In North Dakota alone the estimated deposits are 697,929,400,000 tons, and only 499,480 tons were mined in 1912. This state is, however, probably doing more than any other in developing the use of this fuel, as lignite is the only grade of fuel found in it. All state institutions are compelled by law to use lignite fuel, and the University of North Dakota has been conducting some interesting experiments with it. It has been found that one ton of lignite in a gas producer will yield as much horse power in internal combustion engines as will one ton of the best bituminous coal under steam boilers.

In the seven northwestern states, North and South Dakota, Montana, Wyoming, Idaho, Washington and Oregon, there were 8,661,869 tons of bituminous coal and 5,615,162 tons of lignite mined during the year 1912, or about two-thirds as much lignite as bituminous coal. Of these seven states, Montana, North Dakota and South Dakota have lignite deposits estimated by the Geological Survey to amount to 1,064,424,400,000 tons, which is 2,000 times as much as all the coal mined in the United States during the year 1912. It is evident, therefore, that this section of the country need never want for fuel. The problem is to find a means of handling lignite so that it may be easily transported.

Lignite, in its raw state, will disintegrate when exposed to the air. For this reason it has not been found expedient to use it at points very far from the mines. Attempts have been made to ship it in box cars, but this is an expensive means of transportation, and quite impractical. On account of its crumbling properties the logical way to handle this fuel is in the briquet form. Experiments have shown that in most cases this is impractical without some sort of a binder. The United States Bureau of Mines in Bulletin 58, gives the following estimates of cost per ton of briquetted lignites in different localities: Texas, \$2.80; North Dakota, \$4.04; California, \$4.34. The cost of briquetting in each case is \$1.06, including the binder. During the process of briquetting the large amount of moisture which lignite contains is removed, and the fuel is improved

materially in its heat value. These briquettes are non-coking and will not form clinkers. They are easy to handle and provide a very even fire on the grate.

While there have been numerous unsuccessful attempts to briquet this fuel on a commercial scale, it is not believed that briquetting is entirely impractical. The previous failures have been due in a large measure to many of the plants being promoter's schemes, to insufficient engineering experience, poor market facilities, poor salesmanship and lack of proper advertising, and the uncertainty in the supply of binders. In other words, lignite briquetting has not been given a fair chance, and it demands some well-organized business enterprise which is based on a firm foundation. The railroads in the lignite districts could well afford to give such an enterprise their moral and financial support, as the use of lignite in many districts offers a great opportunity for cutting fuel costs.

THE ST. PAUL, THE LOUISVILLE & NASHVILLE AND THE WABASH

IT would be hard to find three important roads which contrast in so many different ways as the Chicago, Milwaukee & St. Paul, the Louisville & Nashville and the Wabash, and yet it is sometimes instructive to study the results of operation for a given period under widely dissimilar conditions to the end that we may trace, if possible, certain general tendencies in the conduct of railroad business during such a period. This method has certain vital advantages over a mere averaging of conditions over the whole country; the most important of these is that taking an average for the whole country is taking an unweighted average. If three or four railroad properties are studied with the figures kept separate for each, it is possible to carry a mental picture of each property which will more or less accurately give the figures proper weight. With this object in view we have taken the reports of the three roads mentioned and tried to draw some general conclusions from the analysis.

A difference in geographical position is more often an explanation of a difference in operating conditions and results in railroad working than is any other one single factor. The Chicago, Milwaukee & St. Paul and its Pacific coast extension, the results of operation of which were for the first time shown lumped together with those of the parent company in the fiscal year ended June 30, 1913, runs through Wisconsin, Iowa, Minnesota, South Dakota, a corner of North Dakota, Montana, a corner of Idaho, and Washington, and has lines running into Michigan, Illinois and Missouri. The Louisville & Nashville runs through Kentucky, Tennessee, Alabama, a corner of Georgia, and along the southern border of Mississippi, tapping Louisiana and Florida on the south, and Missouri and Ohio on the north. The Wabash runs through the southern portion of Ontario and Michigan, and the northern portion of Ohio, and through Indiana, Illinois and Iowa. Of the three roads, therefore, one is a transcontinental, one a north and south line, with a net of branch lines typical of a southern railroad, and the third an east and west, central classification territory road, almost without branch lines.

Next in importance to geographical position, and, of course, a corollary to it, is character of traffic. Of the total tonnage carried by the St. Paul in 1913, products of mines made up 26 per cent.; products of agriculture, 21 per cent.; manufacture, 19 per cent.; products of forests, 18 per cent.; miscellaneous and merchandise, 11 per cent.; and livestock and animal products, 5 per cent.

Of the total tonnage carried by the Louisville & Nashville in 1913, products of mines made up 61 per cent.; products of agriculture, 8 per cent.; manufactures, 12 per cent.; products of forests, 10 per cent.; miscellaneous, 7 per cent.; and livestock and animal products, 2 per cent.

Of the total tonnage carried by the Wabash, products of mines made up 37 per cent.; products of agriculture, 18 per cent.; manufactures, 20 per cent.; products of forests, 8 per cent.;

miscellaneous and merchandise, 11 per cent.; and livestock and animal products, 6 per cent.

While it might be open to dispute as to whether or not financial condition was the next most important factor to be considered, it is undoubtedly a very important one. The St. Paul has outstanding in the hands of the public \$24,000 stock per mile of line and \$48,000 funded debt. It is paying 7 per cent. on its preferred stock and 5 per cent. on its common stock, the common stock dividend having been reduced from 7 per cent. in 1912.

The Louisville & Nashville has outstanding* \$15,000 stock and \$31,000 funded debt per mile, and is paying 7 per cent. on all of its stock and earning nearly twice that.

The Wabash is in the hands of a receiver and has not been able to meet its fixed charges; its funded debt per mile is \$46,000. Under circumstances and conditions so diverse as these, the absolute operating ratio means comparatively little; but if the trend is not alike on all three, it is worth while trying to get at the significance of the difference.

The St. Paul's operating ratio was 66.84 in 1913 and 72.24 in 1912; the Louisville & Nashville was 75.36 in 1913 and 70.49 in 1912; the Wabash was 77.73 in 1913 and 81.65 in 1912.

Maintenance expenditures vary from year to year more often because of changes of policy than in cost of doing the same kind of work.† The St. Paul spent \$10,649,000 in 1913, as against \$10,007,000 in 1912 on maintenance of way, and \$13,872,000 in 1913 on maintenance of equipment, as against \$11,476,000 in 1912; the Louisville & Nashville spent \$11,033,000 in 1913, as against \$8,829,000 in 1912 on maintenance of way, and \$11,217,000 in 1913, as against \$10,071,000 in 1912 on maintenance of equipment; the Wabash spent \$4,330,000 in 1913, as against \$3,890,000 in 1912 on maintenance of way, and \$5,330,000 in 1913, as against \$5,313,000 in 1912 on maintenance of equipment.

The materially larger maintenance appropriations on the St. Paul do not help to explain the reduction in this company's operating ratio, but the materially larger appropriations on the Louisville & Nashville do help to explain that company's higher operating ratio; and the fact that while maintenance of way expenditures on the Wabash were higher in 1913 than in 1912, maintenance of equipment was only slightly higher, although considerably more work was done by the equipment, only in part helps to explain the lower operating ratio on the Wabash.

The ratio of transportation expenses to total operating revenues is in a way a more accurate reflection of the company's ability to hold down expenses than is the operating ratio, since the transportation ratio eliminates the uncertain factor of changes in policy in regard to liberality or lack of it in maintenance appropriations. The ratio of transportation expenses to total operating revenues on the St. Paul was 37.27 in 1913 and 41.09 in 1912; on the Louisville & Nashville, 33.43 and 32.74 respectively; and on the Wabash, 41.59 and 42.80 respectively. It will be seen, therefore, that the transportation ratio increased on the Louisville & Nashville, but decreased slightly on the Wabash, and markedly on the St. Paul. The explanation of the decreased transportation ratio on the St. Paul is probably that the growth of business on the Puget Sound could

be handled without anything like a proportionate increase in transportation expenses. This is true, of course, because the Puget Sound when first opened had comparatively little local business, and through passenger trains and through freight trains were probably not loaded by any means to their economical capacity. Each additional passenger, therefore, and each additional carload of freight was taken at a very slight additional cost in transportation expenses. If this is the true and governing explanation of the difference in the trend of expenses on the St. Paul and on the other two roads selected, it is of so much importance in understanding the principles underlying the eastern roads' application for advanced freight rates that it is well to carefully examine the other factors entering into the situation which might have a bearing on the question.

The freight density (ton miles per mile of road) on the Louisville & Nashville in 1913 was 1,144,000, and in 1912, 1,098,000; on the Wabash, 1,480,000 in 1913 and 1,243,000 in 1912. The passenger density on the L. & N. was 113,800 in 1913 and 113,100 in 1912; on the Wabash, 145,700 in 1913 and 143,000 in 1912. On the St. Paul the freight density in 1913 was 892,000, as against 687,000 in 1912, and the passenger density, 89,300 in 1913, as against 82,760 in 1912.

Adequacy of equipment, and especially of freight cars, is often an important factor both in obtaining competitive business and in handling economically the business which is obtained. The L. & N. and the Wabash in 1913 had the same number of cars in service per mile of line, namely, 9.4; but in 1912 the Louisville & Nashville had 9.5 as against the Wabash's 8.3. When we come, however, to contrast the number of cars owned and leased by these two roads in proportion to the ton mileage handled the difference is striking. The L. & N. had 8.2 cars per million ton miles handled in 1913 and 8.7 in 1912, while the Wabash had 6.4 in 1913 and 6.7 in 1912. The St. Paul, with its much smaller freight density than either the Louisville & Nashville or the Wabash, owned 6.7 cars per mile of road in 1913 and 6.2 in 1912, and 7.5 cars per million ton miles in 1913 and 9.0 in 1912. In this connection a charge against income of \$1,081,000 in 1913 and \$1,056,000 in 1912 for hire of equipment, debit balance, on the Wabash, with a credit balance of \$623,000 in 1913 and \$499,000 in 1912 on the L. & N., and a charge of \$755,000 for hire of equipment, debit balance, on the St. Paul in 1913 and a debit balance in 1912 of \$404,601‡ is worthy of note.

Length of haul might also furnish some part of the explanation that is sought. The average length of haul on the St. Paul increased from 225 miles in 1912 to 246 miles in 1913. On the Louisville & Nashville the average haul increased from 170 miles to 171 miles; on the Wabash, from 232 miles to 239 miles.

The receipts per ton mile and per passenger mile might also be a very important factor in the change in transportation ratio. On the St. Paul the average per ton per mile was 7.930 mills in 1913 and 8.485 mills in 1912; on the Louisville & Nashville, 7.79 and 7.86 respectively; and on the Wabash, 6.030 and 6.099 respectively. The passenger receipts per passenger mile on the St. Paul were 2.141 cents in 1913 and 2.094 cents in 1912; on the Louisville

*The majority of this stock is held by the Atlantic Coast Line.

†Of course this would not be true over a series of years and is not always true from year to year.

‡This is arrived at by subtracting the credit balance of the Puget Sound from the debit balance of the St. Paul itself, since the two companies were operated separately in 1912.

	Chicago, Milwaukee & St. Paul		Louisville & Nashville		Wabash	
	1913	1912	1913	1912	1913	1912
Average mileage operated.....	9,613	9,570	4,820	4,710	2,515	2,515
Freight revenue	\$67,964,161	\$55,796,065	\$42,924,952	\$40,601,288	\$21,774,362	\$19,074,822
Passenger revenue	18,457,136	16,568,864	12,835,658	12,227,934	7,268,289	6,993,874
Total operating revenues	94,084,055	79,255,355	59,465,699	56,211,788	31,769,287	28,354,764
Maintenance of way and structures.....	10,648,785	10,007,207	11,033,134	8,828,755	4,330,278	3,889,596
Maintenance of equipment.....	13,871,985	11,475,529	11,216,889	10,071,304	5,330,497	4,312,741
Traffic expenses	1,894,343	1,818,642	1,259,702	1,178,108	1,025,136	953,131
Transportation expenses	35,065,842	32,564,968	19,884,015	18,408,197	13,214,059	12,137,368
General expenses	1,403,012	1,388,839	1,417,141	1,139,964	793,519	857,653
Total operating expenses	62,883,968	57,255,184	44,810,880	39,626,327	24,693,489	23,150,484
Taxes	3,823,833	3,921,964	1,761,626	1,854,684	905,892	851,630
Operating income	27,551,003	18,211,790	12,913,621	14,722,598	6,115,222	4,319,475
Gross income	31,523,542	†	15,950,725	17,516,600	6,871,955	4,963,470
Net income	18,140,745	†	8,630,944	9,734,421	163,000	1,893,959*
Dividends	13,912,533	15,071,993	4,618,733	4,200,000		
Surplus	4,228,212	† 5,293,085	4,012,211	5,534,421		

* Loss. † Not accurately determinable because Puget Sound accounts were not included in 1912 St. Paul report. ‡ Deficit.

& Nashville, 2,339 and 2,296; and on the Wabash, 1,926 and 1,945.

A very much more efficient or less efficient use of transportation facilities might help to explain the difference in trend of transportation ratio as between the St. Paul and the other two roads. The number of freight cars per train on the St. Paul in 1913 was 28.7, and in 1912, 27.2; on the L. & N., 20.9 and 21.2; and on the Wabash, 29 in each of the two years. The loaded cars per train were 21.3 in 1913 and 20.0 in 1912 on the St. Paul, and the empty cars, 7.5 and 7.1; on the L. & N., 14.6 and 14.5, and 6.4 and 6.7; and on the Wabash, 20 and 21, and 9 and 8. The load per loaded car was 19.5 in 1913 and 17.7 in 1912 on the St. Paul; 20.3 and 19.6 on the L. & N.; and 21 and 19 on the Wabash. The train load, including company freight, on the St. Paul was 415 tons in 1913 and 355 tons in 1912; on the L. & N., 295 tons and 285 tons respectively; and on the Wabash, 435 tons and 383 tons respectively. We have here an increase of 60 tons in the train load of the St. Paul, 10 tons in the train load of the L. & N., and 52 tons in the train load of the Wabash.

The Louisville & Nashville had about the same length of freight train, on the average, in 1913 as in 1912, with a 5 per cent. gain in loading per car and almost no change in proportion of loaded cars to empty cars in train; the Wabash had just the same average length of train in the two years, with a 10 per cent. gain in loading per loaded car, and a greater proportion of empty cars in 1913 per train than in 1912. The St. Paul's story is in quite striking contrast to these other two roads. Its number of cars per train increased by $1\frac{1}{2}$, and of this average of $1\frac{1}{2}$ cars more per train, a little more than one loaded car was added, and in addition to this the average loading per car was over 10 per cent. greater in 1913 than in 1912.

It might be possible to explain all this difference between the St. Paul and the other two roads by ascribing it to a gain in efficiency of operation, but such an explanation would be strongly against the weight of the evidence. The figures show an increased efficiency in the use of the plant for all three roads, but the greater part at least of the economies that were possible on the St. Paul appeared to be due to the fact that it did not have sufficient traffic per mile of road in 1912 to get the full economical operation out of the plant and had even in 1913, probably, considerable margin between its present business and the beginning of the working of a law of diminishing returns.

There is here a rather striking epitome of the history of the cost of railroad transportation in America and a rather unusual demonstration of the fallacy of a theory that the growth of traffic, if handled with due economy, can offset—by lowering unit costs—increases in wages, prices of materials, etc., to an indefinite extent. This law of increasing returns due to lower unit costs is so obvious and so easily understood when a railroad is handling a very much smaller traffic than it has facilities for that even a good many railroad men themselves until a few years ago failed to realize what the limitations of this law were. Here is the St. Paul, with a new line just beginning to be developed. With an increase of 30 per cent. in freight density, it is able, to increase its train load by nearly 20 per cent., and show, despite a reduction of 7 per cent. in average receipts per ton per mile, despite wage increases and higher prices of materials, a transportation ratio lower by nearly 4 per cent. in 1913 than in 1912. On the other hand here are two roads—the L. & N. and the Wabash, both fully developed properties—one rich, the other in the hands of a receiver; one with a surplus of equipment, the other with apparently rather serious need for additional freight cars; one showing a slightly lower revenue per ton per mile, but a considerably higher revenue per passenger per mile, and the other a slightly lower revenue per ton per mile and per passenger per mile; both showing gains in train loading, but neither able to hold down the transportation ratio, in proportion to growth of traffic.

The table at the foot of the previous page shows the principal figures for operation of the three roads in the two years under review.

Letters to the Editor

THE DANGER OF BEING TOO LENIENT

CHICAGO, March 2, 1914.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have been much interested in the letters published in the *Railway Age Gazette* recently on the subject of discipline of employees, and as those letters have taken up the employees' side, I feel constrained to write from the standpoint of the superintendent.

After considerable experience as an official in the operating department, let me say that the meting out of discipline is the most irksome of my duties, and that much may be said on the subject to enlist sympathy for the trials of the superintendent. A man in this position would need to be possessed of the patience of a Job, the wisdom of a Solomon and the judgment of a Daniel to adjudicate successfully on the various and varied cases coming before him constantly.

The remarks of "J. F. M." in his letter, "Humiliation for Misconduct," are largely buncombe. We can all agree that in the ordinary intercourse one with another in this world, courtesy, kindness and a broad sympathy should govern, but we do not receive this sort of treatment if we do not deserve it, and we are usually treated as we do deserve.

The writer mentioned asks "Why is it that in the investigation of train accidents many railroad officers do habitually indulge in the harsh and irritating methods of the prosecuting attorney?"

I do not agree that the word "habitually" fits the case of any officer, but if "J. F. M." had himself held a few investigations he would not need to propound this question at all. From an extended acquaintance with railway operating officers I say that generally they are honestly desirous of treating, and do treat, employees fairly—in fact, it is to their own personal interest and the interest of their respective companies that they do so; but if such methods as "J. F. M." refers to are used, it is most often because of the difficulty in getting at the facts from the parties concerned. When a number of men implicated in an accident testify to conflicting stories and it is almost impossible to determine the real facts, the officer conducting the investigation may be excused for exercising extreme measures to elicit the truth. To shed tears over the poor, humiliated employee at such a time, or when he has been guilty of flagrant violation of rule or carelessness, endangering human lives and valuable property, is nothing but namby-pamby stuff.

Anyone who has ever attempted to handle a large body of men, scattered over hundreds of miles of railway, knows that a lenient, "easy" policy is followed by very poor results, and that with its exercise a general laxness will quickly pervade the whole force.

In the training and supervision of train and engine men, as compared with clerks, shopmen or others, the great handicap is that during the larger part of the time that the men are on duty, they are thrown upon their own responsibility and are beyond the eye of the officer in authority. While, when an officer is present they will live up to the rules, the casualties occurring from time to time indicate that, when there is no one around to watch them, some are inclined to be careless, and, in railway parlance, to "take chances," although they know better. What are we going to do with such men when caught? Merely talk to them kindly and courteously and let it go at that? Why! they would go away and laugh over it.

It must be borne in mind that these men on entering train service are required to study and understand the operating rules and undergo a thorough examination therein. While undoubtedly many men will take to heart a serious talking to, there are others on whom words have very little real effect, and some fear of punishment for dereliction of duty must be present in their

minds in order to spur them to put forth their best endeavor.

It is absurd to talk of applying to train employees, with their responsibility as to life and property, the same methods of discipline as in the case of clerks, shopmen and others who have not such responsibilities. In proportion to the responsibility of a man's position and the seriousness of the consequences that may result from his wrong acts, so must he suffer for them. This is a law of life.

I do not wish to be thought lacking in sympathy for the man who has made a mistake and frankly acknowledges and is sorry for it; for to err is human. But in deciding whether an employee in train service should be dismissed or not, the superintendent has a duty not only to his company but to the public and cannot allow his emotions to sway his better judgment. Several cases come to mind in which I had cause to mourn for having exercised leniency in such circumstances.

Nor do I wish it to be construed that I make any sweeping assertions as to untruthfulness or carelessness of the employees in train service in this country. On the whole, they are a magnificent body of men. But I do wish to emphasize that their duties and responsibilities are such as to demand a high standard of efficiency, and that while they are entitled to considerate treatment, the same as other members of the human family, the superintendent cannot, in his company's or the public interest, afford to pass over their delinquencies lightly. SUPERINTENDENT.

DIFFERENT KINDS OF PUNISHMENT

BALTIMORE, Md., February 19, 1914.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

It is difficult to get the point that "A. F. M." seeks to make in his letter under the heading "Retributive Punishment" in your issue of the 13th instant, but when he attaches so very much importance to the statement of Thomas M. Osborne as quoted by him, and when he concludes his letter by saying "the railroad officer who undertakes to punish a man who possesses any mental or moral character whatever, is assuming a grave responsibility," it is a question whether his mental perceptions are not obscured by the milk and water excuses for the consequences of error, so characteristic of the present day. The excessive commiseration of the effects of moral weakness, the excusing and pampering of weaklings on the plea of hereditary taint, "the vote for women," advocated by so many under the hazy idea that she will bring about reforms that men cannot effect for themselves—all these are symptomatic of a yielding to circumstances of difficulty which bodes ill for the stability of the state.

Another symptom of this disease of excessive sentimentalism is the tendency to make wire-drawn distinctions in degrees of guilt, and this is especially the feature of "A. F. M.'s" letter. In the portion of T. M. Osborne's address, which he quotes, we find the following: "Two people guilty of the same crime may be actuated by entirely different motives, and be in need of entirely different treatment. If punishment could be made precisely to fit the crime there might be some argument for the retributive system, but this cannot be done." Now we all know that the blundering magistrate and judge is not a curiosity, and if he is less so with us than in other countries, we owe it to our delightful elective system, which too often works out to "snow under" the man who shows a tendency to rise above the common average. But to argue practically that because police court justice is administered chaotically in New York, therefore retribution shall not follow wrong doing is to yield to that womanish dislike of pain and suffering that causes so many criminals to go unwhipped of justice in the present day.

This brings us to a discussion of the wire-drawn distinction between discipline that is punitive and discipline that is corrective on railroads. The distinction seems to originate in the idea that up to recently the discipline imposed by officers of railroads has been inspired by sentiments of revenge or spite, and that now we are to have a new order of things where the officer will sit down with an offender and ask him kindly why he did so and so and so and so. I think the charge that dis-

cipline on railroads has been freely imposed in a spirit of revenge or spite is a gross aspersion on the manliness and good character of 95 per cent. of the officers, past and present, who have been charged with enforcing it. What between the shortage of means to ends, the criticism of their superiors and the hampering of the labor unions, it would certainly be a marvel if tempers were kept on all occasions, but to imply that a whole code of ideas in regard to the enforcement of discipline is now being changed from punitive to corrective is to convey the inference that officers have been grossly wrong in the way they have handled their men in the past; and this inference is all the stronger from the fact that there must be considerable difficulty in appreciating the exact difference between discipline enforced by punishment and discipline enforced by correction. It is an old saying "Give a dog a bad name and you may as well hang him," and it is an easy way to condemn the past and those who have made it by asserting a wide difference in new methods from those practiced formerly.

But is there this difference? The recording against a man in a book of any infractions of rules or actions subversive of discipline is punishment with the object of correction just as much as suspension is punishment with the object of correction. The man disciplined knows, of course, that he has had a black mark set against his name. If that is not punishment—what is it? The endeavor to draw this distinction between discipline carried on by punishment and discipline carried on by correction looks like an attempt to separate effect from cause.

Meantime it would seem that such letters as this of "A. F. M." must tend to further harass the afflicted railroad superintendent. It seems too hard that with all the practical and pressing problems he has to deal with from day to day, he should be hampered by the trembling fluttering of the wings of those "angels of mercy" who today bless the world with so much sweetness and light. O. W.

SIMPLIFYING THE TONNAGE RATING PROBLEM

NEW YORK, N. Y., March 16, 1914.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In reply to Alex. P. Gest's comments in the *Railway Age Gazette* of March 13, page 500, on the article on "Simplifying the Tonnage Rating Problem," I feel called upon to mention some points which Mr. Gest has evidently overlooked.

The method of tonnage rating described was verified about four years ago by exhaustive service tests, using several types of locomotives, on several different divisions. The calculations originally made were changed somewhat as dictated by the tests, and are therefore not purely theoretical.

No two locomotives of the same class are identical in their performance. To allow for this, as well as to amply cover several other troublesome variables, such as locomotive near the repair period, slippery rails, etc., 10 per cent. is deducted from the calculated tractive effort to obtain the available tractive effort. The results of continued service on the railroad in question show that this allowance is very liberal.

Any variation of the internal resistance of the locomotive would make such a slight difference in the available tractive effort that this feature can be neglected.

Authorities on train resistance agree that .05 per cent. per degree of curvature added to the grade is an ample allowance for curvature.

After the exhaustive tests made under the direction of Professor E. C. Schmidt, of the University of Illinois, to determine the train resistance of various weights of cars, there should be no hesitancy about accepting the data which these tests developed. Most engineering work is based on the results of tests, and if engineers are unwilling to depend upon data such as Professor Schmidt determined, the work of our leading engineering experts would indeed be in vain.

The method of tonnage rating outlined in the article has behind it the weight of the best engineering authorities, but its best recommendation and its complete justification are found in regular daily service. R. S. MOUNCE.

The Agency Plan on the St. Louis & San Francisco

Splendid Results Obtained by Making Agents Responsible for Traffic—Notes on Station Efficiency

While the station agent is expected on most roads to perform certain duties for the traffic department, he reports direct to the division superintendent who is an operating officer and in that capacity may hire or discharge him. The responsibility of the agent to the other departments (operating, accounting, etc.) is definite and specific and can be checked up by means of reports made at stated intervals; the attention given to traffic affairs is dependent entirely on the judgment and good faith of the agent. The traffic department having no direct authority over him receives consideration only after the other departments have been taken care of. On the Frisco the division superintendents are responsible for traffic as well as for the operation of their districts, and likewise the agent is responsible for the traffic in his territory, as well as for his other duties.

THE PLAN

The success of the railroad depends on the desire of the public to patronize it, and this sentiment is fostered by personal contact between the patron and some responsible representative of the carrier. The station agent comes in daily touch with a greater number of customers than all other officers combined, and on his standing in the community depends the success or failure of the company. The plan in effect on the Frisco is based on making the agent the representative of the company and in handling all questions arising between the patrons and the company through him, thus encouraging the people to do their business with the agent rather than with some particular officer direct. If questions arise that the agent cannot dispose of finally, he can make his recommendation to the proper officer and secure a decision in less time than usually occurs under the other method. It is also intended to direct the attention of agents and those aspiring to the position of agent to the opportunity that offers for effective work and the exercise of their best judgment, thus opening the way to advancement. Several agents have recently been appointed assistant superintendents.

This plan was first started on the Frisco in the spring of 1912 and has now developed to such an extent and is giving such good results as to warrant a detail account of its workings. Its progress was slow for the first year or year and a half, but has been very rapid since the addition to the staff of each of the division superintendents, the first of last December, of an assistant, whose sole duty it is to look after the agents and station work on the division. The station employees and stations had not been given the attention that their importance entitled them to. There were no staff officers specializing in this branch of the service, which from the standpoint of revenue and relations of the railway with the public is of prime importance.

This additional supervision has made it possible to plan and bring about improvements of various sorts at the stations and some of the most important of these will be considered in the latter part of this article. Under the old scheme the station agent reported to the division superintendent on matters affecting operation, and to the division freight agent and the division passenger agent on traffic affairs. The agent was only partly responsible for the solicitation of business, that responsibility being divided with the traveling freight agents. Under the new organization the agent is entirely responsible for traffic matters, as well as for the operation of the station, and reports on all matters to the division superintendent, who is also responsible for traffic and operating affairs on his division. Under the old plan the agent had fewer opportunities for coming into favorable contact with the public; sometimes his most intimate contact with it was when it had complaints to make. Then, too, when the traveling agent came around and called on a few businessmen or citizens

he did not have the standing in the community that the agent had, who was a citizen, and who was the man that the patrons on the line had to go to every day in the transaction of their business with the railroad company. In a great many instances where the agent could be spared from the station he accompanied the traveling freight agent on his visits around town. As a matter of fact the major portion of the business the traveling freight agent secured was business that the agent told him about, and the traveling freight agent received the credit for it. There was no way in which the agent could bring to the attention of the division superintendent, the man who controlled his job and his salary, the amount of good work he was doing in the way of securing additional traffic for the company. Now he is the representative of the road in his district, and because of his duties in soliciting traffic keeps in close touch with the shippers and receivers of freight. In the dual capacity he better appreciates the possibilities of his position and is better able to make a favorable impression on and serve the best interests of the public.

His standing in the community and the possibilities of making a favorable impression are increased by the fact that he is also empowered to settle claims for damage to freight or for livestock killed on the right of way and fires set by sparks from the locomotives. As we have noted in previous articles, such claims are handled on the Frisco under the direction of the transportation department and the agent is given the power of settling claims for loss and damage to freight by cash payment for damage amounting to less than \$50. Arrangements are now being made for the distribution of drafts which will enable him to settle immediately for damage to livestock and fires set by locomotives. Knowing the people and understanding the conditions in his vicinity he is better able to reach a proper understanding in these matters and the prompt payment is far more satisfactory to the injured parties.

It was prophesied by some when this step was first taken that the amount paid out for damaged freight claims would rapidly increase. What really happened was that it has steadily decreased since the agents took charge. And there are good reasons for this. Under former conditions the receiver of damaged freight realized that it would take some time and considerable red tape to secure redress, and so made a claim for two or three times the actual amount of the damage done. Now the agent goes over the damaged goods with the consignee, checks over the invoices, comes to a reasonable agreement and pays cash for all claims under \$50. On a freight loss and damage claim for over fifty dollars on which he wishes to make a cash settlement, he can get approval from the superintendent, assistant superintendent, or superintendent freight loss and damage claims, either personally, by letter or by wire. There is no limit to the settlement he can make on livestock and fire claims.

When claim adjusters were employed their efficiency was determined largely from the ratio of the amount paid out to the total amount of the claims settled by them. The farmer who had had one experience with them usually profited by it on his second complaint and made the amount of his claim sufficiently large to offset the claim adjusters' probable reduction. Now the agent gets in touch with the section foreman and takes the matter up with the farmer, knowing all of the conditions pertaining to the case. The farmer knowing that his claim will be settled at once, and knowing the agent and his knowledge of local conditions, is reasonable in his demands and is much better satisfied with the treatment accorded him. Under this plan the claims per head of livestock killed have increased several dollars; some portion of this is due to the fact that the market value of the animals has increased and the rest no doubt to the

fact that agents are making more equitable settlements. Prompt and fair settlements mean much in securing the good will of the public. Moreover, the farmer is always suspicious of the professional claim adjuster; the agent and section foremen are his fellow citizens and neighbors, and he has confidence in their honesty of purpose.

The territory covered by each agent is clearly outlined and extends half way to the nearest station on each side. Naturally additional help has had to be given to the agents to enable them to take on the increased responsibilities. The nature and extent of this depends on the size of the station and the conditions in the surrounding territory. In some cases it was necessary to provide a chief clerk who could handle the station work; in smaller stations an additional clerk or helper was all that was required. This additional help has cost the company more than the salaries of the traveling freight and passenger agents and others who were displaced; but the plan is a marked success from a financial standpoint because of the increased efficiency of the agents in securing business and in giving better service to the public. And this latter is not uttered as a platitude or considered on a theoretical basis as a thing which brings indirect results. Rather it is a real asset. It is the little things that often do much to displease the public, and often their displeasure voices itself in unfair actions toward the railroad on the part of the local communities, or adverse legislation on the part of the state. By giving the agents full responsibility in dealing with the conditions in their districts a far better understanding between the road and the public may be maintained. Also the division superintendent to whom the agent reports is within easy reaching distance, and he or one of his assistants (not clerks but assistant superintendents) is ready to work with and stand back of the agent if he needs assistance.

Naturally the change from the old organization to this new plan has been a gradual one, and while it has been in process for many months has not yet become fully developed over all parts of the system. Some agents have taken over the responsibility readily; others, more timid, are taking advantage of it more slowly.

Most of the divisions on the Frisco are large—several hundred miles in length and with more or less branches—and the assistant superintendent in charge of station work spends much of his time on the road and sees that the station agents are properly instructed in their duties. Here there are great possibilities, as will be noted in the latter part of this article. It should be understood that this whole plan is a comparatively new development, that it is far better developed in some places than others, and that much still remains to be done to make it more effective.

ADVICE LETTER SYSTEM

An agent in visiting the commercial houses makes it part of his business to find out what orders they have placed or expect

to place which may be routed over his road. He requests the prospective consignee to specify Frisco routing on the order; or if the order has already been placed to instruct the shipper that the shipment be made via the Frisco. If the material is to be shipped in car load lots he fills in, on returning to his office, what is known as a "pink form," or advice letter. These forms are printed on pink paper; one of them is shown in the illustrations. Three carbon copies are made, one going to the representative at the point where the shipper is located, one to

136 Rtn. 93 L. E. Data 6-13-22475 JAMES W. LUSK, W. C. NIXON, W. B. BIDDLE RECEIVERS. Form 2107 Standard

FRISCO
LINES

Dear Sir:—

In reply to your advice letter No. _____ of _____

Have to advise the following: _____

(Signed) _____

This copy must be sent to Assistant General Freight Agent, St. Louis, Mo

Form Used for Reply to Advice Letters—Printed on Green Paper

the division superintendent and one to the freight traffic department. The representative who interviews the shipper and tries to get the business fills in what is known as a green form when the matter is closed—whether he gets the business or not—and sends copies to the agent who started the inquiry, the division superintendent and the freight traffic department.

The agent who originated the inquiry does not file the original pink slip until the green form has been returned to him. The green slip is then attached to the pink one and they are filed, when the shipment has been actually received, in numbered order. The receiving agent and the freight traffic department

100M 13-11 90800 Form 2111 New Form 2111 Standard. File _____

Mr. _____ 191

URGER FOR REPLY

To my communication of _____

Subject _____

Form Used When Reply to Advice Letter is Not Received Within 30 Days

file them by points of origin. For example, the agent at Springfield issues advice letter 104 to the traffic representative in Detroit. This advice letter will be filed in Springfield in numerical order, but will be filed by the Detroit representative and the freight traffic department at St. Louis in their Springfield file. The agent keeps his pink slips, which have not been closed out, in a basket or drawer, and if he does not receive a reply within 30 days sends out an "Urger for Reply" to make sure that his advice letter has not been lost or overlooked. The agent also keeps such pink slips as he has received from other points in a separate file or basket until he can report on a green form; he then

136 Rtn. 93 L. E. Data 6-13-22475 JAMES W. LUSK, W. C. NIXON, W. B. BIDDLE RECEIVERS. Form 2108 Standard

TO BE USED FOR CARLOADS ONLY. **FRISCO** Advice Letter No. _____

Mr. _____

Dear Sir:—

This is to advise you that _____

of _____ has placed order with _____

at _____ for shipment of _____

_____ routing of which is controlled by _____

PLEASE INTERVIEW AT ONCE AND SECURE FOR FRISCO LINES.

REMARKS _____

(Signed) _____

If necessary to telegraph this advice same must be confirmed on this form.

Form Used for Advice Letters—Printed on Pink Paper

files them. If the business is lost the green slip should show the cause and the prospects for securing future shipments.

Some idea of the extent to which these advice letters are used may be gained from the fact that for the five months ending December, 1913, there were 10,613 such letters sent out covering 19,864 cars of material. As copies of all of the letters and the replies are sent to the freight traffic department office and filed there, it is possible to keep an accurate check on the efficiency of each station, and this is done.

In addition to the car load lot advice letters, advice is also given as to L. C. L. shipments on a separate form. One of these

THOS. H. WEST, W. C. NIXON, W. B. BIDDLE, RECEIVERS

To be used for
L. C. L. only

FRISCO
LINES

Form 2108 STANDARD.

L. C. L. INFORMATION LETTER NO. _____

FRISCO MERCHANDISE PACKAGE CAR SERVICE.

Mr. _____ 191

Dear Sir—

_____ of _____

placing orders (L.C.L.) with _____

for _____ moving from _____

_____ routing ahead on orders.

Business has been moving _____

Frisco scheduled package car service is _____

from _____ via _____

Endeavor to arrange future routing accordingly.

Remarks _____

(OVER)

Form for Advice Letter Containing Information About L. C. L. Shipments

forms is reproduced in the illustration. On its back appears the following under the head of co-operative suggestions:

CO-OPERATIVE SUGGESTIONS

Explain to ALL merchants and others in Frisco territory, who buy in less-carload quantities, just what Frisco Merchandise or Package Car service is from markets in which they purchase and, wherever possible, get proper ROUTING ON ORDERS instead of Routing Orders. Remember that it costs from ten to fifty cents to place Routing Orders.

Don't neglect the corner grocery, drug store or other retailers. They have L. C. L. business and want and need good service.

Impress on shippers that efficient Package-Car service to Frisco territory can be maintained only through consistent and continued use of such service; that *Regularity of Service* is dependent upon *Regularity of Patronage*.

The habit of showing Frisco Routing ON ORDERS will promote regularity of movement from shipper to consignee, simplify tracing, and save time for shippers in connecting Routing Orders with orders received unrouted.

Of course, no attempt is made to follow up and check the individual L. C. L. advice letters as in the case of the letters for car load lot material. They are, however, a valuable means of getting the agents or solicitors at the point where the freight originates in touch with shippers who may be prevailed upon to route their business over the Frisco.

The chief value of the advice letters is that they keep the agents and traffic organization constantly stirred up over the movement of freight and develop a most healthy condition in the solicitation of traffic.

RESULTS

The results of the change in organization and the "agency system" can easily be imagined. The advice letter system, together with comparative reports of the business handled at the different stations, spurs the agents on and forces them to keep in close touch with the shippers and receivers of goods. Undoubtedly it will mean a more rapid growth and development of traffic than if the old methods had been adhered to. The agent will also prove a more and more important factor in the development of the territory served by the railroad in connection with the unique and productive work which is being done by the department of development, which will be described in a later issue. Since the inauguration of the agency plan a most thor-

ough monthly business report has been developed which allows the superintendent to study carefully and easily the increase or decrease, as compared with the previous year, in the amount of each class of traffic at each station.

The combination of traffic and transportation matters under the division superintendent has developed some interesting experiences in connection with the solicitation of business. There is a tendency for everybody in the division organization to appreciate the value and necessity of getting business, and in place of one traveling agent soliciting shipments the officers and employees are more and more getting interested in using their efforts and influence to secure business. This works another way also. Because they are interested in getting and keeping business they are more careful to handle the freight in such a way as not to damage it and to see that it is expeditiously delivered. In other words, there is a growing tendency toward team work and a spirit of "everybody work for the Frisco."

Here is an illustration of one way in which a division superintendent got interested in the traffic problem after it had been placed under his direction. A large amount of fence posts had been brought in for shipment at one of the small stations and had been piled on the company property awaiting the receipt of orders for shipment. These orders did not come. The superintendent wanted the business and so sent out a letter to agents in the non-timber districts on the system asking them to bring the matter to the attention of users of such material in their neighborhoods. As a result the pile of fence posts was soon cleaned up and the station now does a regular as well as a considerable business in this commodity.

IMPROVEMENTS IN STATION SERVICE

Making the agent a bigger man by increasing his responsibilities, as above noted; making him the representative of the railroad in his city or town, and adding an assistant in charge of station work to the staff of each division superintendent has focused attention, among other things, on the necessity of improving the station service. In the remaining part of this study an attempt will be made to point out a few improvements which are being made, or which it is planned to make, which will do much to build up a strong bond of good will between the railroad and the public. The public is sensitive about little things and every reasonable effort should be made to keep the stations clean, neat and convenient. The assistant superintendents in charge of station work have been added to secure better results from the station force from the standpoint of traffic and operation, but more especially from the standpoint of giving good service to the public. The agent and his staff may make a good or bad reputation for the company in his district. The station should be kept clean and should be handled in a businesslike manner. It is important that the agent get along well with the patrons, and if he cannot do so, no matter how efficient he otherwise may be, he will have to be transferred to a position where he can make good or must be discharged. The public is far more critical than it has ever been before and such things will not be tolerated.

The Occasional Traveler.—The occasional traveler who is not familiar with the railroad practices and is timid should be given special attention. Watchfulness on the part of the station force for the needs of these people will be greatly appreciated and will do much to make for a good reputation for the road.

Selling Tickets.—Nothing is more aggravating to a customer than to find the ticket window open but no one to wait on him. This practice should not be tolerated and the selling of tickets should be delegated to some one who can give it his entire and full attention. The ticket window should be opened 30 minutes before train time, and when it is opened the fact should be announced in a clear and loud voice.

Bulletin Boards.—Care should be taken to have the figures on the station bulletin boards legible and the boards should be cleaned frequently and be repainted as often as necessary to keep them in a neat condition. The headings for the different columns and the train numbers, time of arrival and time of de-

parture should be painted on the board and repainted when the schedules are changed. This leaves only the data under "Hours and Minutes Late" to be filled in in chalk and practically gives a time card at each station. This, of course, is not applicable to stations with a large number of trains, but there are comparatively few such on the Frisco.

Heating and Lighting Stations.—More attention should be paid to heating stations. It would be difficult to estimate the amount of coal which is wasted by keeping them too hot. There is much variation in the practice as to arrangement and upkeep of station stoves, pipes and wiring of pipe. During May all the stoves and stove pipe will be taken out of all stations by men from the bridge and building department and removed to the nearest division storehouse, where they will be repaired, polished and put in first-class condition for the winter. During September they will be replaced in the stations and set up by employees from the bridge and building department. This will greatly improve the heating facilities where stoves are used.

A little study given to the arrangement of lighting fixtures will add much to the convenience of the traveling public.

Toilet Rooms.—The filthy condition of toilet rooms in many stations is a disgrace and the reputation of a railroad may suffer severely from this fact. A campaign is about to be started—has been started in some places—to bring up and maintain the toilets in the highest possible state of perfection. It means the expenditure of money, but on the other hand, it is sure to be noticed by the patrons, especially the commercial travelers, and is sure to be appreciated. It will probably result in the use of standard fixtures and an arrangement which will permit of greater convenience in keeping the toilet rooms clean and in a sanitary condition. Unfortunately the public often abuses these conveniences, and it may require considerable time and educational work before they are fully appreciated, but the effort will be well worth while.

Station Grounds.—Railroads spend thousands of dollars in attracting desirable settlers to the unsettled districts along their lines. Railroad stations are usually located in the least inviting part of the city or town and travelers often gain a poor impression of a place when they pass through it on the train. The station grounds should be kept clean and neat. The outbuildings and the station itself should be kept well painted. Windows should be cleaned regularly. Stoves should be polished, or radiators should be touched up with paint occasionally. Cards and signs should not be tacked up miscellaneously, but should be grouped in one place. There is no excuse for having a lot of equipment or debris standing outside the building. Everything should have its place. Baggage trucks placed wherever the men happen to drop the handle do much to add to the untidy appearance of many stations. It is just as easy to put them in a place arranged specially for them, and no time will be lost in finding them when they are needed. The advertising value of keeping the station grounds neat and orderly cannot be overestimated and may have a strong moral effect on other industries in the immediate neighborhood.

Station Forces.—The division superintendent has full control of the station forces and may add to or reduce them as he finds it necessary. Under former conditions, if an increase was desired, so much time was lost in red tape that the need had sometimes passed before permission to add to the force was granted. It took so much time and work to get a new man that the superintendent was reluctant to part with him if there was not sufficient need for his services and was liable to retain him until conditions improved. Now it is up to the superintendent to get results and he is not handicapped or interfered with. If he has not sufficient good judgment to handle such matters efficiently he is not the man for the job. The actual handling of this matter is in the hands of the assistant superintendent, who makes his recommendations to the superintendent.

Order of Promotion.—The Frisco intends in the future to educate and develop its own men rather than to hire experienced men from other roads. In no case should the latter course be

followed until all other means are exhausted. With this end in view it is the intention to give more attention to the selection of all employees and to take them from towns and cities on the line. In order that there may be a proper incentive for men to enter the station service, all positions paying \$50 or more will be bulletined over the division so that men in low paid positions at small stations will be in line for better positions at other stations. To this end the following circular was issued by the general superintendents on March 1, 1914:

Without permission in writing from the superintendent, agents will not employ clerical or other help, or promote employees at their own station. When a vacancy occurs the agent will call on the superintendent, who will select the man. In cases of emergency, agents may employ men to fill vacancies with the understanding that the service is temporary until the superintendent can select the proper men. Men for vacancies at the following large stations will be selected from station employees on all divisions, including terminals: St. Louis, Kansas City, Springfield, Memphis, Birmingham.

The object of these instructions is to discontinue employing experienced men from other roads to fill vacancies at stations, and secure such men from the smaller stations and to give the men at smaller stations an equal opportunity with the men at larger stations to secure the better paying positions at the larger stations; to employ inexperienced men for the minor clerical positions, and educate and promote them to the better paying positions.

Better Loading of Cars.—As noted in the article on "Reducing Transportation Costs on the Frisco," which appeared in last week's issue of the *Railway Age Gazette*, the agent is a most important factor in seeing that the freight cars are loaded more nearly to their capacity. In addition to this he must make sure that the material is properly loaded. Wonderful reductions have been made on the Frisco in recent years in the claims for lost and damaged freight. Few roads can equal its record today. Even more, however, may be accomplished in this direction and agents at the large merchandise centers are instructed to ride on the local trains occasionally to see how the goods loaded at their stations check out. If improperly loaded they can profit by the experience.

Filing of Tariffs.—Special attention should be given to keeping the tariffs on file at the stations in a neat and orderly condition. A poor idea of the business ability of the company is often conveyed by the disorderly way in which these are kept. The same thing is true of the large amount of other records and material which must be filed in the freight house office. For a very small expenditure they could be neatly filed in pine boxes or cases where they could be easily referred to. Meanwhile they would be kept clean and in good condition and the office would present a far more businesslike appearance.

Stationery Supplies.—No special attention had been given in the past to the amount of stationery carried at the stations, and investigation developed a bad condition in this respect. The surplus material was assembled, with the result, for instance, that on one division enough forms were found of certain kinds to supply the entire division for a year, and there were enough of all kinds to keep the division running for 60 days. Also the stationery was sometimes stored in an untidy way, resulting in damage and loss and anything but an orderly appearance. One function of the assistant superintendent is to watch this condition closely and see that it is remedied. It is planned shortly to install a supply train for station material. Each station will have a standard list of supplies and the stock will be replenished from the supply car at regular intervals.

Agents' Meetings.—The agents on the various divisions have organizations and meet from time to time to discuss problems which arise in connection with their work. It is the practice to vary the place of meeting in order that the members generally may get better acquainted with the territory served by the road. The programs for these meetings are arranged in advance and the meetings are planned and conducted entirely by the agents. Usually some one of the higher officers or representatives from other departments are invited to address them, but these visitors cannot participate in the business sessions, which are exclusively for the agents. These organizations are responsible for many suggestions which have resulted in improved practices, and their value from an educational standpoint is hard to overestimate.

George Westinghouse—A Review of His Life and Work

The Notable Career of a Great Railway Engineer, a Distinguished Scientist and An Exemplary Citizen

George Westinghouse, inventor of the air brake for railroad trains, inventor and developer in many other mechanical and electrical fields, philanthropist, and one of the chief citizens of the Republic, died at his apartments in New York City, March 12, of heart disease, having been confined to his room for about three months; previous to which time he had been for some months at his country house in Lenox, Mass. The fatal malady began to show itself over a year ago, and he had gradually withdrawn from all business activities. He is survived by his wife and by one son, George W., Jr., a graduate of Yale and recently married. The body was buried at Woodlawn Cemetery, New York City.

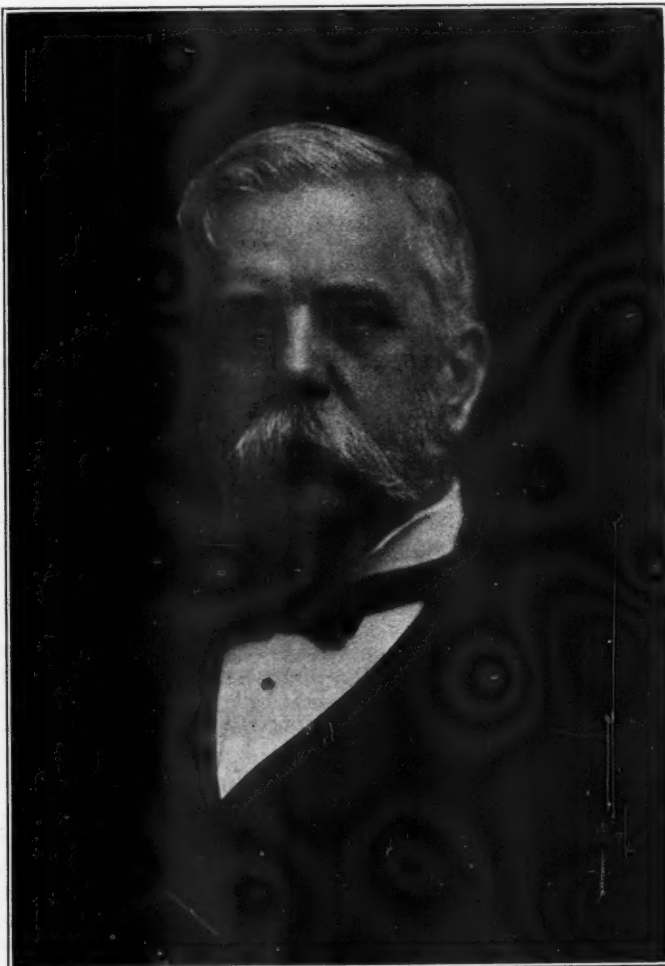
The will of Mr. Westinghouse provides for the continuation of his large business interests under a trusteeship, and his death will bring no change in the administration of any of the numerous important concerns of which he had been the leader.

The great and outstanding invention of Mr. Westinghouse is the air brake. By this his name was carried all over America before he was 25 years old, and all over the world before he was 35. His later inventions are less known because they are less easily comprehensible and because the world is now so full of other wonders; but the benefits which they confer on mankind are immeasurable. In his intense and catholic devotion to the genuine progress of civilization, as distinguished from mere personal glory or aggrandizement, Mr. Westinghouse was as much of a developer as an inventor; as truly enthusiastic in carrying out others' ideas as his own; and his notable contributions to general progress include electric lamps; long distance electric power transmission, made possible only by means of his development of the alternating current; the steam turbine, the friction draft gear and the wide utilization of natural gas.

A very brief survey of Mr. Westinghouse's activities in these several fields, beginning back in the later seventies, as soon as the complete success of the air brake was assured, will make clear the unique and outstanding genius of the man; namely, the sanity and vigor with which constantly, year after year, he devoted his brilliant talents and his unbounded energies always in the most useful channels available. As the small or weak man seeks constantly the line of least resistance, this giant constantly took the opposite course. He aimed to throw the whole force of his own ability, the talents of his assistants and the facilities of his great shops and laboratories into that line where the world most needed those abilities, talents and facilities. And, though he was not free from mistakes, his mind was so active and fertile, his perceptions

so wise, that he kept in the front rank of progress throughout the 40 years of his active career. Unlike many mechanical geniuses, he was large hearted and human; a philanthropist who elevated the lives of his workmen. The verdict of history will recognize the unique combination; a mechanic possessed of genius, a versatile scientist and thinker of the first rank, and a humane "business man." Not the smallest element in the success with which he carried out his purposes in these diverse lines was the loyal co-operation of his brother, Henry Herman Westinghouse, and of other lifelong coadjutors, whom he selected with unusual insight and rewarded with liberality.

George Westinghouse was born in the village of Central Bridge, New York, October 6, 1846. His father, George Westinghouse, who came from Vermont, was of German descent, and his mother's ancestors were Dutch-English. The elder Westinghouse established in Schenectady, in 1856, the Schenectady Agricultural Works; and in the father's shops the boy spent much of his leisure time. Before he was 15 he invented and made a rotary engine and at an early age passed the examination for the position of assistant engineer in the United States Navy. He served in the army in the Civil War, first in the 12th New York National Guard and later as third assistant engineer in the navy. At the close of the war, resisting solicitations to remain in the navy, he entered Union College, Schenectady, but at the end of his sophomore year he abandoned his classical studies and entered on his active life. It is said that the president of the college in substance advised him to take that course, predicting that in the course of time he would become a great engineer. Indeed, even before this, in 1865, he had made his



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G. Westinghouse

first railroad invention, a cast steel re-railing frog.

THE AIR BRAKE

The air brake, like the re-railing frog, was suggested by actual necessity as shown by a train accident, in 1866. Westinghouse first thought of a brake attached to the car couplers, but this, when tried, proved impracticable. Next he tried steam, which could not be kept hot. At this point, Fate seems to have entered his life. In the pages of a magazine to which he had subscribed through the solicitation of a young woman, he saw an account of the use of compressed air in drilling the Mont Cenis tunnel; and instantly the inventor saw the light. After much reflection, drawings of the air-pump, brake cylinder and valves were made, and a caveat was filed in 1867; but it was not for a considerable time after this that he was able to make a trial of the brake. He moved to Pittsburgh; and there he finally secured the aid of Ralph Baggaley, who guaranteed the payment of the foundry bill

for the first apparatus. This was in 1868. The brake was tried on the Steubenville accommodation train of the Pittsburgh, Cincinnati & St. Louis. It received its initial trial unexpectedly on its very first run. The engineman, seeing a wagon stuck on a crossing not very far ahead, applied the air. Like everybody else, he was not free from skepticism; but the brake averted an accident and its popularity was thenceforth assured.

The first patent was issued April 13, 1869. The Westinghouse Air Brake Company was formed on the 20th of July, following. The first shop was established with 20 workmen. In the autumn of 1869 a demonstration was made on the Altoona grade for the Master Mechanics' Association, in connection with the annual meeting of the association.

The success of the brake—which was the "straight air"—on the Pittsburgh, Cincinnati & St. Louis, led a number of other roads to make applications and soon it was known throughout the country. There had been experiments with chain brakes before, and considerable sums had been spent on coil spring arrangements and other notions, but the compressed air brake was the first device of the kind that had a lasting success. The slight competition of the vacuum brake had but a brief influence and finally died out.

It is difficult at this day to appreciate the revolution produced in 1870-75 by the introduction of such a radical innovation as the air brake. The brakeman's trade had become a fine art, like that of a mountain stage driver, and he was proud of his proficiency. But all his skill was superseded by a little valve in the locomotive cab, smaller than a door knob, and easier to turn, by which the engineman could set every brake in a long train and have the train well nigh stopped, before the brakemen could wind up the slack in the chains. Compressed air is only less subtle, in its outward manifestations, than electricity, and the sight of trains stopped without the application of any apparent force to the wheels was nothing less than magic to a railroader seeing it for the first time. From long habit, a flagman who signaled a train to stop, came to regard the ear-splitting alarm whistle as a most essential feature of the stopping process; and to see a train safely and quickly halted without the whistle and with practically no noise whatever, was not a whit less wonderful than to have seen a train propelled by a ghost.

In 1870, Mr. Westinghouse went to London to introduce the air brake on the English roads. This was a difficult problem, as the usual practice in Europe was to have no brakes at all, not even hand brakes, except on the brake vans and tenders. This enterprise required the spending of seven years in Europe between the years 1871 and 1882. It taxed the inventor's ability to meet the new conditions of railroad practice; but he succeeded in introducing the air brake for use on passenger trains on a number of prominent roads.

But the greatest triumph was the advent of the automatic brake in 1872-73. The original or straight air system was dependent on the integrity of the car couplings. With the "automatic" and its wonderful triple valve, the line of pipe through the train was normally filled with air at 70 lb. pressure and the release of this pressure caused the application of the brakes; and of course the breakage of a car coupling, causing the parting of a train, applied the brakes and stopped both of the separated parts.

And this invention of the triple valve, to meet the first great obstacle encountered in the pursuit of a perfect braking system, was only the beginning of a series of inventions which solved the difficulties incident to the successive enormous increases in weight, length and speed of trains. If a new problem, or series of problems, demanded the inventor's application for 17 hours a day for successive months, or if elaborate and complicated details called for the work of a dozen of the most expert specialists simultaneously, the resources of the Westinghouse establishment were devoted to the task and it was accomplished.

In 1886-87 the "quick action" brake was brought out. The air brake had at first been introduced only on passenger trains. On the mountain railroads of the West, its value was soon demon-

strated on freight trains also; and from these roads it spread slowly to the other parts of the country, so it came about that the inventor was confronted with an entirely new problem, that of braking very long trains. But with a fifty-car train, the cars in the front portion were stopped much sooner than those in the rear portion, so that when the slack ran in, there was a small collision—or perhaps a serious smash-up. The elaborate three-weeks' trials on the Burlington road near Burlington, Iowa, in 1886, under the direction of the Rhodes Committee, form a prominent page in American railroad history. At the completion of these trials the conclusion was quite general that electricity would afford the only possible means of controlling power brakes on long trains; but Mr. Westinghouse determined, if possible, to adapt the air brake to the new conditions; and he triumphed. If the original triple valve was an epoch-making invention, this modification of it was only second in importance.

The triple valve had reduced the time for the application of the brakes on the whole of a ten-car train, as compared with the straight air, from 25 seconds to 8 seconds; and now the power was made to act throughout a train of 50 cars in 2 to 3 seconds. It was in October and November, 1887, that the exhibit train of 50 freight cars made its triumphal tour of the United States. Railroad men were amazed when they saw a loaded freight train, 1,700 feet long, running at 40 miles an hour, brought to a stop in less than 600 feet. In 1869-70, the wonder had been in seeing a train stopped apparently by an unseen power; in 1887, the wonder took the shape of a striking display of power. As compared with former performances, the stoppage of a train by the new apparatus appeared to be a manifestation of energy on an incredible scale.

The high-speed brake, a modification found necessary for stopping, within a reasonable distance, the heavy passenger trains now in use, when running at 70 and 80 miles an hour; and the electro-pneumatic brake, making possible the remarkably efficient express-train movements in the Interborough subways in New York City, are the latest developments in this art, and all made by the Westinghouse establishments.

ELECTRO-PNEUMATIC SIGNALS

About 1880, Mr. Westinghouse became interested in the use of compressed air for the operation of switches and signals. A year before this, automatic block signals of the clock-work style, displaying disks, had been put in use on 10 miles of the Fitchburg railroad, near Boston, controlled by track circuits. Mr. Westinghouse saw the great possibilities of the inventions embodied in this installation and he secured control of the company making it. Buying also the only American company making mechanical interlocking apparatus, he established the Union Switch & Signal Company. By the use of compressed air, he was able to operate full size semaphores where previous designers had been limited to light-weight apparatus, and after a very brief development, the pneumatic apparatus was perfected by the application of electric control. By laying the air pipes and the electric wires underground, this system first provided adequate control of the switches in large passenger-station yards, not only introducing marked economy, but also enhancing safety.

The Union Switch & Signal Company was broadened to do all kinds of signal work and is now the largest establishment of the kind in the country.

NATURAL GAS

A temporary but highly important enterprise which engaged Mr. Westinghouse's attention was the Philadelphia Company. Under this organization the use of natural gas in the manufactories of Pittsburgh was made possible by the genius of Mr. Westinghouse; for the inventions which he made in piping and the administrative organization which he established under the name of the Philadelphia Company, were the deciding elements in its success. The Philadelphia Company changed the sky of Pittsburgh from black to blue, and this condition continued until the supply of gas began to fail, about 1890.

ELECTRIC LIGHT AND POWER

Watching carefully the whole electrical field, Mr. Westinghouse, about 1887, sent an engineer to Europe on a general investigating tour, and on receipt of this engineer's report, and after a very few hours' consultation, promptly closed the bargain for the acquisition of rights for transformers, which became the basis of the wonderful achievements of the Westinghouse establishments in the use of alternating currents during the next few years, in the transmission of power very long distances.

The Westinghouse Machine Company was established in 1881; and the Westinghouse Electric Company was started in 1886, being later expanded into the Westinghouse Electric & Manufacturing Company, organized in 1891. The works of this company at East Pittsburgh employ 22,000 persons.

In 1892, Mr. Westinghouse, in the face of the most strenuous opposition and after fighting injunctions and all manner of legal obstacles secured the contract for lighting the grounds of the World's Fair at Chicago, making the price in round numbers a million dollars less than that of any other bidder. The great power houses at Niagara Falls, N. Y., the wonder of the time, were the product of Westinghouse ideas.

In the electrical field, Mr. Westinghouse had secured the patents and the co-operation of Nikola Tesla, whom he aided in developing the use of the rotary magnetic field. In every direction, the highest talent available was employed and the leader kept every department busy. A half dozen enterprises of the first magnitude were kept going at one and the same time. Inventions of others were bought and the laboratories were equipped regardless of cost. The Nernst lamp was perfected at enormous expense. The Cooper Hewitt lamp and innumerable devices needed in the operation of electric railways were among the other things developed.

The question of the steam turbine and its applications was investigated by Mr. Westinghouse and he secured the patent rights of Charles A. Parsons, of England, on the turbine in 1897-98. This development of a new prime mover soon led the inventor to consider the use of the turbine as a prime mover for ships. Mr. Westinghouse at this time developed one of the most ingenious embodiments of modern mechanical engineering, namely the mechanical reduction gear for reducing the inherently high speed of a turbine to the slow speed of a ship propeller or direct current dynamo. He accomplished this work in collaboration with the late Admiral Geo. W. Melville, U. S. N., and John H. MacAlpine. Within the last few years he had occupied himself with the development of an air spring for automobiles and motor trucks which rapidly came into favor.

In 1907, the Westinghouse Electric & Manufacturing Company became financially embarrassed. The operations of the company had been laid out on an ambitious and extensive scale and in the financial stringency of that year the stockholders failed to take up \$5,000,000 of new stock. This prevented the company from making the loans necessary to carry it over the dull times, and a receivership had to be resorted to. This lasted fourteen months, and the company was reorganized in December, 1908. The bondholders' committee put Robert Mather at the head of the company and Mr. Westinghouse had to relinquish the presidency. There was much friction between Mr. Westinghouse and the financial interests which came into control, and the company was a long time in recovering. The financial interests tried a number of plans, but it was Mr. Westinghouse's own plan which finally had to be adopted and which led to ultimate recovery. The common stock had paid 10 per cent. dividends for four years up to 1907, but nothing was paid on the common shares from then until 1912. In 1913 four per cent. was paid.

HONORS

His many achievements in mechanics, electricity, steam and gas brought Mr. Westinghouse honorable distinctions from all parts of the world. His alma mater, Union College, conferred upon him the degree of doctor of philosophy. He was decorated with

the order of the Legion of Honor, with the order of the Royal Crown of Italy, and with the order of Leopold of Belgium. He was the second recipient of the John Fritz medal. He received the degree of doctor of engineering from the Koenigliche Technische Hochschule of Berlin. He was an honorary member of the American Society of Mechanical Engineers, of which body he was president in 1910. The archives of that company contain the authentic history of the air brake. He was awarded the Scott premium and medal by the Franklin Institute of Pennsylvania, and received the Edison gold medal for meritorious achievements in the alternating current system of electrical distribution. He received the Grashof gold medal from the Society of German Engineers in Germany, which acknowledged him the greatest American engineer.

A partial list of the industries in which he was an officer or leader includes the Westinghouse Air Brake Company; the Westinghouse Machine Company; the Nernst Lamp Company; The Union Switch & Signal Company; the Societe Anonyme Westinghouse, Paris; the Cooper Hewitt Electric Company; the Societe Italiana Westinghouse, Italy; The East Pittsburgh Improvement Company; the Westinghouse Brake Company, Limited, of London; Westinghouse Cooper Hewitt Company, London; the Westinghouse Friction Draft Gear Company, and the Westinghouse Metal Filament Lamp Company, Limited, London. He was also chairman of the board of directors of Westinghouse Electric Company, Limited, London, and a director in the Westinghouse Metallfaden Gluhlampenfabrik, Vienna.

The Westinghouse companies altogether employ 50,000 men and the total capitalization of all the companies is \$200,000,000.

PERSONAL CHARACTERISTICS

Mr. Westinghouse's biographer will have to devote one of his largest chapters to the man's personality, from what might be called the non-technical side. His kind heart was a worthy complement of his phenomenal mind. It is recorded that in his first shop, started in 1869, he introduced the fifty-four-hour week and the Saturday half-holiday, at that time new things in America. Of the Employees' Association at the air-brake village he was not only a member, but a regular attendant. He was a pioneer in providing model dwellings for the employees of the shops on a large scale, and at reasonable prices. Young inventors whom he aided spoke of him not only as a wise and powerful supporter, but as a sympathetic friend.

He was a man of great physical strength, six feet tall, and lived an abstemious and sober life; never smoked, and ate and drank sparingly. Change of work constituted his principal diversion; he was too modest and serious to care much for "society."

It was these qualities which enabled him, in the strenuous contests with rival inventors and contractors which attended his electrical enterprises, to accomplish continuous and sustained mental tasks which to the ordinary mind are simply incomprehensible in their magnitude. His friends in the world of science were men of the highest class. Lord Kelvin spoke of him as one of the great men of his time, and the two were congenial spirits.

For an estimate of the man's essential character and motives we cannot do better than to say, in substance, what has been said in these columns before (*Railroad Gazette*, November 1, 1907): It would be quite impossible to even attempt to give any adequate notion of the multitudinous interests into which his restless mind has penetrated, always with the aim of producing practical and useful results.

"Why has he done this? Why has he set aside ease and pleasure? Why has a man of such vivid imagination given his years to unceasing toil? Why has he repeatedly ventured fortunes in great enterprises? He might have retired at 40, a very rich man with a name known and honored all over the civilized world, with a great capacity for enjoyment and with abundant means to gratify all the tastes and desires of his enterprising and versatile spirit. Probably Mr. Westinghouse himself could not have answered these questions. He has worked as all great men have worked—in obedience to an internal, compelling force. It is cer-

tain that the desire to amass and leave behind him a colossal fortune has been the most insignificant element in the forces that have driven him forward. It is certain, also, that he has always felt a noble aspiration to do good in the world, to really serve mankind. Unquestionably, he loved power and responsibility. Unquestionably, too, he was keenly alive to the good opinion and the approbation of the best minds. But it is very doubtful if these recognized incentives to exertion and self-sacrifice have been other than contributory to the main result. Behind it all lay that mysterious, impelling force (the definition or analysis of which is perhaps impossible) which pushes men forward as fast and as far as their powers permit them to go. The directions which they take, the results which they achieve, depend upon the qualities of their minds and on their moral natures; and these we can discern and analyze, but the driving power behind is often beyond our comprehension.

"The sources of his power over men are perhaps easier to discern than are the underlying motives of his conduct. Men felt immediately the dominating force of his will. They recognized at once when they came in contact with him the breadth and power of his intellect. And then, as they went on, they discovered his generosity, his magnanimity, the loftiness and purity of his motives; and they were attracted by the simplicity of his manners. People often said that he had great personal magnetism. So he had—whatever that may mean. But, after all, that is merely an easy phrase in which to sum up the resultant of the noble qualities of his mind and character."

TIMBERS PRESERVED IN SALT

In replacing a trestle recently burned along the north shore of Great Salt Lake, engineers found piles perfectly sound after 43 years of service. At another point on the lake, piles 18 in. thick, set 29 years ago, are similarly preserved with salt which has penetrated to their very center. Timbers in the Southern Pacific trestles across Salt Lake, placed in 1902, appear to be as good as on the day when the piles were driven. They have been preserved well above water line by the salt dashed on to them by the waves.

The first transcontinental telegraph line, built before the railroad, was abandoned when the railroad was built, and the old poles were sawed off at the ground. An engineer who recently examined the butts left in the ground in the salt desert near Fish Springs found that, although fifty years had passed since the poles were cut off, the old butts were perfectly sound.

Telephone companies in the Salt Lake valley use salt for preserving poles. When set up, about a bushel of salt is placed around the pole on the ground. This method can not be used, of course, in any place where vegetation is desired. The reason why the waters of Salt Lake act as a strong preservative, as distinguished from ocean waters, is because the lake water is so much saltier, being practically a saturate solution.

JAMES S. HARLAN

James S. Harlan, who was appointed a member of the Interstate Commerce Commission in August, 1906, has been elected chairman of the commission, succeeding as chairman Edgar Clark, who, of course, remains a member of the commission. Mr. Harlan has been in direct charge of the rate advance hearings now in progress, and for this reason if for no other his election to the chairmanship is of especial interest and importance.

Mr. Harlan has a keen legal mind and a judicial temper, backed by good common sense. He has, moreover, the rather rare gift of concise, clear expression. He is able to write not only a sound opinion in a case, but a readable one. He is less given to glittering generalities than is any other member of the commission. Among recent opinions by Commissioner Harlan

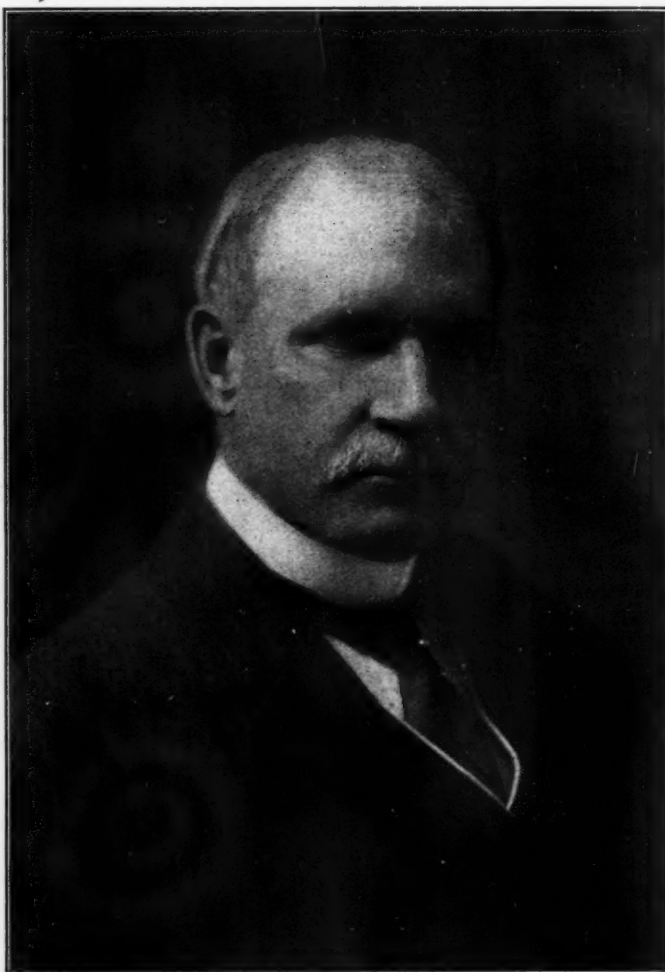
is the one in regard to the Chicago, Milwaukee & St. Paul accounting case, which for its grasp of technical detail and clear expression of the essentials in the case in non-technical language was a remarkably good piece of work.

In his conduct of the rate advance cases he has shown a keen alertness and a good grasp of complex questions. His conduct of the case would seem, when compared with the strict procedure of a court, to permit of a good deal of latitude; but on the other hand the Interstate Commerce Commission is an administrative body as well as a judicial body and the standards of the commission permit of a freedom in the introduction of testimony and a lack of formality that is quite at variance with court procedure. Mr. Harlan's questions from time to time show quite plainly that he himself is able to separate the essential from the unessential and is not at all in danger of being carried away from the main points involved by the introduction of irrelevant testimony or statements of counsel.

James S. Harlan was born in Evansville, Ind., November 24, 1861. His father was John

Marshall Harlan, a justice of the United States Supreme Court until his death in 1911. James S. Harlan graduated from Princeton in 1883 and the following year began the study of law in Melville W. Fuller's office in Chicago. He was admitted to the bar in 1886 and became a member of the firm of Gregory, Booth & Harlan, which later became Harlan & Harlan. In 1901 he was appointed attorney general of Porto Rico for two years. In 1906 President Roosevelt appointed Mr. Harlan as a member of the Interstate Commerce Commission.

THE SOUTH MANCHURIA RAILWAY TO BUILD A HOTEL.—The South Manchuria Railway has included in its estimate of expenditures for this year, the construction of a railway hotel at Mukden, to cost about \$150,000. The proposed hotel will be three stories in height. It will contain about 50 rooms and be provided with steam heat and elevator service.



James S. Harlan

The Complicated Terminal Problem of Chicago*

Plans for Reorganizing Chicago Terminals. Proposed Operation of Clearing Yards and L. C. L. Clearing House

By W. H. LYFORD

General Counsel, Chicago & Eastern Illinois

There are 31 trunk lines of railroad reaching Chicago, owned by 24 separate companies. All of these lines come into terminals within an area about a mile square, in the center of the city. From this small center they radiate like the spokes of a wheel in every direction excepting due east.

There are 6 passenger terminals, which collectively receive all through trains and, with the exception of the Illinois Central, all suburban trains. There are 56 freight stations in the downtown district, and 144 in the entire city. The railroads handle, in and out of the city daily, about 125,000 suburban passengers and 70,000 through passengers. They also bring into the city 260,000 carloads of freight per month, and take out about the same number, handling in and out about 17,500 loaded cars daily.

PASSENGER TERMINALS

I think I may safely say that only one of the passenger terminals in this city, the North Western, is in any sense permanent. All of the others have already outgrown their usefulness and will soon be entirely changed and rebuilt or combined on broader lines.

The Union Station on the west side is to be replaced with a monumental structure in the same neighborhood. The Pennsylvania, Burlington and St. Paul, which use it, want to remain on the west side, and the people of this city are willing that they should do so.

I predict that all of the other lines will join the Illinois Central in the magnificent station which it is about to construct on the lake front at Twelfth street. That station should be capable of taking care of all of us for 15 or 20 years, and if we should then outgrow it, some of us can move west of State street, where we own ample property for a passenger station for all time.

Certainly the new North Western Station, the new Union Station, and the new Illinois Central Station, will have ample capacity to take care of the through passenger traffic of this city for many years to come.

So long as the people on the west side want to keep two large passenger stations on that side of the river, we owe it to the traveling public to connect the west side stations with the Illinois Central and any other stations on this side of the river by direct surface or subway lines on which passengers can conveniently transfer from one station to another with their hand luggage, and at a cost of five cents.

The suburban passenger has no use for a monumental terminal station. He wants to reach all parts of the business district of the city, and for his purposes there should be a number of stations or covered platforms within the loop district, at any one of which he could stop, and at some of which he could transfer to any surface, subway or elevated line to any part of the city.

A subway loop connecting all of the terminal passenger stations, for the sole use of suburban trains, has been suggested. It is utterly impracticable. All of the suburban fares collected on all of the railroads in this city would not pay the interest on the cost of a subway sufficiently large to carry all of these suburban trains. Excepting the Illinois Central and the North Western, all of the other roads are losing money on their sub-

urban business now. The suburbanite cannot afford to pay materially higher rates than he is now paying.

There is only one proper solution of the suburban problem, and this is the thought to which I wish to give prominence on the passenger question, namely, one of the subways which are proposed should be connected with all of the railroads at points outside of the business district. All suburban trains of the steam railroads should pass through the subway loop instead of stopping at the passenger terminals. A sane development of this idea will be the turning over by the steam lines of all their suburban business to the company which operates the subway, and by electrifying the suburban tracks, moving the subway trains out on the steam railroads through the suburban district. I have been advised by competent authority that this electrification will not cost more than \$5,000 per mile of single track.

Until the subways are constructed, the suburban trains could be transferred to the elevated roads at existing crossings of the steam lines, at substantially the same points I have named for connections with the subways. All suburban trains could then run at high speed on the steam railroads, and take their passengers to any point in the loop district or, by convenient transfers, to any part of the city on any surface, elevated or subway line. Two or three cents additional fare per trip would be the outside limit of increase from his present fare, and he would be given the privilege of universal transfer to any part of the city without extra charge.

That the operation of electrified suburban trains on the same tracks with through passenger trains is feasible, has been proven by the experience of the New York Central railroad at New York City. The wonderful success of the Interborough subway in the same city has established the practicability of operating high speed, 10-car, suburban trains through a subway loop.

FREIGHT TERMINALS

The subject of freight terminal facilities is far more important than the subject of passenger terminals. On account of the radiating lines of railroad extending in all directions from the congested center of the city, industrial centers have been built up in all parts of the city along these radiating lines. As a general rule, the only direct connections between railroads which interchange traffic at Chicago are at the hub of the wheel in the congested district bounded by Kinzie, Canal, Sixteenth street and Lake Michigan.

Of the enormous volume of freight traffic coming into this, the greatest railroad center in the world, 51 per cent. is destined to Chicago, and 49 per cent. passes through Chicago. Of the through freight, 70 per cent. is now delivered directly by the inbound to the outbound line, and only 30 per cent. is handled by belt lines. The 70 per cent. which is directly delivered passes through the congested part of the city, and is the cause of a large part of the smoke nuisance charged to the railroads and a large part of the congestion of downtown tracks.

The elimination of carload transfers from the downtown district was first undertaken by the railroad companies because it was the easiest problem to solve. Its solution is at hand in the reorganization of the Belt Railway of Chicago, which was accomplished in November, 1912, and in the extension and improvement of the large yard at Clearing, which is now under way. Twelve railroads have entered into a lawful combination to solve this problem. All of the other roads will join them when they are ready to commence operations.

The Clearing yard and its approaches and appurtenances will

*Address before the Traffic Club of Chicago on February 26. Mr. Lyford, although now a lawyer, was previously for several years in the engineering and operating departments of the Chicago & Eastern Illinois and is one of the leading authorities on Chicago railway terminal affairs. He was chiefly instrumental in bringing about the reorganization of the Belt Railway of Chicago by which many of the principal railways of that city became stockholders in that company, and the Belt leased the clearing yard for the purpose of handling much of the interchange traffic outside of the city.

be completed by next October, and all interchanges of carload freight and empty cars will then be removed from the city. Each company with its own engines will take to Clearing solid trains made up of cars for other roads. At the Clearing yard these cars will be distributed by gravity into solid trains for each load. The same engine and crew which brings the miscellaneous train to the Clearing yard will return to its own road with a solid train to go out on its line.

All empty cars will also be distributed into solid trains for the owning roads, and the Clearing yard will become a reservoir for empty cars.

The place selected for the Clearing yard separates the western and northern roads from the eastern and southern roads, and is the natural point of interchange. The Clearing yard consists of a tract of land $\frac{1}{2}$ mile wide and $3\frac{1}{2}$ miles long, with the open avenue of the inner Belt connecting by the shortest possible route with every railroad reaching the city. The Clearing yard also connects at the west end with another belt line, which will furnish another avenue for reaching every trunk line. In one or the other of these two belt lines, every railroad whose lines reach Chicago is financially interested, with the exception of the Chicago Great Western and the Alton, and the Alton is directly connected with the Clearing yard.

The Clearing yard has been consolidated with the inner belt, and 12 railroad companies have secured the use of the combined plant for 50 years. Provision has been made to the extent of \$50,000,000 for increasing the trackage and other facilities of the inner belt and Clearing yard, so that every railroad may have an open line of connection with the Clearing yard. The establishment of the Clearing yard makes possible another revolution in the freight handling facilities of this city, the effect of which will be more far-reaching and more advantageous to the people of the city than any change already suggested.

L. C. L. FREIGHT

The railroads daily bring into this city 10,000 tons, and take out 15,000 tons of less-than-carload freight. Only 40 per cent. of the inbound freight is delivered to the consignee at the terminal station of the inbound road. Sixty per cent. or 6,000 tons of freight per day is taken out of inbound cars at the terminal stations and transferred to other roads, the transfer being made as follows: By trap cars, 30 per cent., by teams 52 per cent. and by tunnel 18 per cent.

Of the 9,000 tons of outbound L. C. L. freight originating at Chicago daily, and shipped from the outbound freight houses, 52 per cent. comes to the house by trap cars, 28 per cent. by teams, 13 per cent. by tunnel, and 7 per cent. by lighters on the river. The 41 per cent. of outbound freight received by teams and tunnel leaves the city the same day it is shipped from the industry. The 59 per cent. received by trap cars and lighters leaves the city not earlier than the evening of the next day after it is shipped.

The volume of L. C. L. freight which under present methods must be handled at the downtown freight terminals has already outgrown the capacity of the terminal facilities and the capacity of the streets leading to them. The result is an average delay of more than an hour for each team, and a congestion of downtown streets which has become unbearable.

The use of motor trucks for station work is prohibited by the amount of dead time lost in reaching the station platform. The cost of team delivery of L. C. L. freight to and from the loop district exceeds an average of \$1 per ton. For longer trips it reaches \$2 per ton. Unless the shipper has direct access to the tunnel, private switch or lighters, he must deliver his freight for each road at its terminal station, generally requiring a separate trip to each station because of the street congestion and the delays at the station. Only a few large shippers have access to the tunnel, lighters or private switches.

The average citizen must team his freight, at a cost to him of at least \$1 per ton. Trap car, lighterage and tunnel charges are paid by the railroad companies. Mr. Brandeis, the present mentor of the Interstate Commerce Commission, has discovered

this fact, and has decreed that this alleged discrimination in favor of the few large shippers who have access to the tunnel, lighter or private switch must cease. Whether we approve or not, the absorption of these terminal charges as a part of the transportation rate is doomed. I predict that within three months the shipper who is now enjoying this service free, will be paying at least \$1 per ton for it. If he abandons this service, he must resort to teams, and the streets in the downtown district, which are already congested, will become absolutely impassable.

While the shipper are facing this dilemma, the railroads are facing a greater one. The cost to the railroads of handling L. C. L. freight through the city of Chicago under present methods, is more than the profit derived from its carriage to and from the city. We are prepared to prove that on some classes of L. C. L. freight shipped, say, from Pittsburgh to Milwaukee, by way of Chicago, the cost of handling the freight within the city limits of Chicago exceeds the gross revenue charged for the entire transportation from Pittsburgh to Milwaukee.

The volume of traffic at Chicago is increasing at the rate of 5 per cent. per year, and as our terminal facilities are already congested, the cost of handling, per ton, increases with the volume. To acquire the necessary real estate in the downtown district to enlarge our terminal facilities along present lines, would cost from \$20 to \$40 per square foot, and even if the railroads could afford it, the city would not permit them to extend their Chinese wall in the congested district. The problem must be solved in some other way.

After studying this great problem in all its phases for many months, we are prepared to suggest a remedy. It is not an untried remedy, but we have devoted much time and thought to its investigation and have discussed every phase of it with the men who are most competent to judge as to its practicability, having had years of experience in the actual handling of freight. They all agree that the L. C. L. clearing house will best meet the needs of both shippers and the railroads.

The cities of St. Paul and Minneapolis have for several years enjoyed the facilities of an L. C. L. clearing house. First, the Minnesota Transfer Company was organized and established a crude transfer platform half way between St. Paul and Minneapolis, at which transfers of L. C. L. freight were made for all of the railroads. Later, the Hill lines, the Great Northern and Northern Pacific established clearing houses of their own, the Hamlin Transfer and the North Town Transfer respectively, at which was delivered all of the L. C. L. freight for each of these lines originating at either St. Paul or Minneapolis, the movement from the city to the transfer plant being made in trap cars miscellaneous loaded. Later, the Chicago, Milwaukee & St. Paul established a similar clearing house known as the Twin City Transfer, for its L. C. L. freight from these two cities. The results in each case have been a heavier lading of outbound cars and economy in handling.

President Earling, of the Milwaukee lines, has stated that by the use of the clearing house the L. C. L. freight moving out of St. Paul and Minneapolis on his line is being handled in 40 per cent. less cars than were required under the old method which is in vogue in Chicago.

We propose to establish, in the vicinity of the carload clearing yard, a series of houses side by side, and all connected with each other by a cross platform. The several units as well as the cross platform will be equipped with moving sidewalks, and each railroad company will lease and operate one or more units of the station, each unit consisting of one platform with its mechanical appliances for moving freight, and with two railroad tracks on one side for loaded cars and five or six tracks on the other side for empty cars to be loaded in station order for destination.

Instead of standing 100 to 200 cars at each downtown station, and allowing them to remain there all day, to be loaded for destination, we propose that all cars loaded in the downtown district shall be loaded to the roof, as trap cars, and moved to

the clearing house as soon as loaded, instead of remaining all day in the downtown district. The 59 per cent. of l.c.l. freight which now reaches the downtown station by trap car and lighter, will be sent directly to the clearing house, which it will reach in less than one-half the time now taken to reach the downtown house. The 13 per cent. of tunnel freight should also go directly to the clearing yard, either by tunnel or by trap car from some convenient tunnel station. This would wholly remove from the downtown station from 59 to 72 per cent. of all the freight which now occupies it, and to that extent would increase its capacity for the legitimate business for which it is necessary.

We then propose to double the capacity of the present downtown house by opening broad streets or driveways on each side of it, and placing the tracks under the streets and driveways, thus giving teams access to both sides of the house, instead of one side as at present, and also enabling the truckers to load into cars on both sides of the platform. The freight will be moved from the street level to the lower or track level by the use of the ramp, with mechanical appliances to regulate the speed of the truck which carries the freight.

The congestion of downtown streets leading to the freight district will be removed by straightening the river, so that Franklin, Fifth avenue and LaSalle streets can be opened through to the south, at least to Archer avenue. We would add also intermediate streets or driveways 70 feet wide, leaving the buildings 60 feet wide, which is ample for station purposes and is an economical width for commercial purposes. The use of trap cars at the downtown station, and the loading of the nearest car to its full capacity, would eliminate all longitudinal trucking from the station platform, and would again double the capacity of the platform for handling traffic. The use of the clearing house for classifying freight would make possible the location of universal freight houses in every industrial district of the city. This would enable one shipper to take to one station all freight for all roads, thus materially reducing the number of teams or motor trucks required for this purpose. The freight would be moved in trap cars to the Clearing yard, and there redistributed and loaded for destination.

All lighter freight would be carried by the lighters to one convenient point, and there loaded into trap cars which would be sent to the clearing house instead of being transferred, as now, to the downtown station. We should largely increase the lighterage service by establishing continuous docks along the straightened river or at street ends, from which freight would be taken to a convenient lighterage transfer for loading into trap cars for the clearing house.

Lake freight also could be most economically handled at the Clearing yard. At the new city harbor north of the river, all l.c.l. freight not destined for team delivery in the central business district would be placed in trap cars and carried in full trains by the Northwestern to Clearing, or placed on lighters and carried on the river and drainage canal to Clearing, or to the lighterage transfer.

The South Chicago harbor is already connected with the Belt Railroad, of which the Clearing yard is a part, and all freight arriving at South Chicago would be transferred by rail to Clearing. Finally, we would recommend that the surface traction lines be authorized to move trap cars between 2:00 and 5:00 a. m. from surface side tracks to railroad freight yards, to be thence moved by the steam railroads to the Clearing yard.

The efficiency of a clearing house depends upon the extent of its use. If only one-half of the l.c.l. freight of the city is handled in the clearing house, it is only 50 per cent. efficient. If all of the freight is centered there, its efficiency is 100 per cent. The comprehensive plans which I have outlined contemplate 100 per cent. efficiency.

Assuming, as we must, that the absorption of existing lighterage trap car and tunnel allowances must be discontinued, we have gone far enough to feel assured that by the adoption of the Clearing system, the cost of handling and transporting l.c.l. freight to and from and through the city of Chicago will be re-

duced 50 per cent. to the railroads, and 75 per cent. to the shippers.

As to delay of freight, we are satisfied that package freight delivered at the downtown stations before 2 p. m. will leave the city for destination as early in the evening as at present, while freight delivered at the downtown houses after 2 p. m. will leave the city about six hours later than at present. On the other hand, the much larger volume of freight which is now handled by trap cars and lighterage, and all of the transfer freight, will leave the city eighteen hours earlier than at present. While the downtown freight house is limited in its operations by the hours of the working day, the operations of the clearing house, to which the public has no access, will be continuous day and night.

The clearing house opens up another possibility of tremendous importance to the shipper. The railroads will need for their purposes only the track floor of the clearing house for the handling of freight, and possibly one other floor for the clerical force. Ten story warehouses could be constructed above the different units of the clearing house, and the cross platform which will connect them, and the space in such warehouses would be the most attractive and economical of any warehouse space in the world, being directly connected with platforms from which freight is being shipped to every part of the world.

THE ALASKA RAILROAD LAW

Following is the Alaska railroad bill in full. It was approved by the President, March 12, and is entitled "Public—No. 69—63d Congress."

An Act to authorize the President of the United States to locate, construct, and operate railroads in the Territory of Alaska, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the President of the United States is hereby empowered, authorized, and directed to adopt and use a name by which to designate the railroad or railroads and properties to be located, owned, acquired, or operated under the authority of this Act; to employ such officers, agents, or agencies, in his discretion, as may be necessary to enable him to carry out the purposes of this Act; to authorize and require such officers, agents, or agencies to perform any or all of the duties imposed upon him by the terms of this Act; to detail and require any officer or officers in the Engineer Corps in the Army or Navy to perform service under this Act; to fix the compensation of all officers, agents, or employees appointed or designated by him; to designate and cause to be located a route or routes for a line or lines of railroad in the Territory of Alaska not to exceed in the aggregate 1,000 miles, to be so located as to connect one or more of the open Pacific ocean harbors on the southern coast of Alaska with the navigable waters in the interior of Alaska, and with a coal field or fields so as best to aid in the development of agricultural and mineral or other resources of Alaska, and the settlement of the public lands therein, and so as to provide transportation of coal for the army and navy, transportation of troops, arms, munitions of war, the mails, and for other governmental and public uses, and for the transportation of passengers and property; to construct and build a railroad or railroads along such route or routes as he may so designate and locate, with the necessary branch lines, feeders, sidings, switches and spurs; to purchase or otherwise acquire all real and personal property necessary to carry out the purposes of this Act; to exercise the power of eminent domain in acquiring property for such use, which use is hereby declared to be a public use, by condemnation in the courts of Alaska in accordance with the laws now or hereafter in force there; to acquire rights of way, terminal grounds, and all other rights; to purchase or otherwise acquire all necessary equipment for the construction and operation of such railroad or railroads; to build or otherwise acquire docks, wharves, terminal facilities,

and all structures needed for the equipment and operation of such railroad or railroads; to fix, change, or modify rates for the transportation of passengers and property, which rates shall be equal and uniform, but no free transportation or passes shall be permitted except that the provisions of the interstate commerce laws relating to the transportation of employees and their families shall be in force as to the lines constructed under this Act; to receive compensation for the transportation of passengers and property, and to perform generally all the usual duties of a common carrier by railroad; to make and establish rules and regulations for the control and operation of said railroad or railroads; in his discretion, to lease the said railroad or railroads, or any portion thereof, including telegraph and telephone lines, after completion under such terms as he may deem proper, but no lease shall be for a longer period than twenty years, or in the event of failure to lease, to operate the same until the further action of Congress: *Provided*, That if said railroad or railroads, including telegraph and telephone lines, are leased under the authority herein given, then and in that event they shall be operated under the jurisdiction and control of the provisions of the interstate commerce laws; to purchase, condemn, or otherwise acquire upon such terms as he may deem proper any other line or lines of railroad in Alaska which may be necessary to complete the construction of the line or lines of railroad designated or located by him: *Provided*, That the price to be paid in case of purchase shall in no case exceed the actual physical value of the railroad; to make contracts or agreements with any railroad or steamship company or vessel owner for joint transportation of passengers or property over the road or roads herein provided for, and such railroad or steamship line or by such vessel, and to make such other contracts as may be necessary to carry out any of the purposes of this Act; to utilize in carrying on the work herein provided for any and all machinery, equipment, instruments, material, and other property of any sort whatsoever used or acquired in connection with the construction of the Panama Canal, so far and as rapidly as the same is no longer needed at Panama, and the Isthmian Canal Commission is hereby authorized to deliver said property to such officers or persons as the President may designate, and to take credit therefore at such percentage of its original cost as the President may approve, but this amount shall not be charged against the fund provided for in this Act.

The authority herein granted shall include the power to construct, maintain, and operate telegraph and telephone lines so far as they may be necessary or convenient in the construction and operation of the railroad or railroads as herein authorized and they shall perform generally all the usual duties of telegraph and telephone lines for hire.

That it is the intent and purpose of Congress through this Act to authorize and empower the President of the United States, and he is hereby fully authorized and empowered, through such officers, agents, or agencies as he may appoint or employ, to do all necessary acts and things in addition to those specially authorized in this Act to enable him to accomplish the purposes and objects of this Act.

The President is hereby authorized to withdraw, locate, and dispose of, under such rules and regulations as he may prescribe, such area or areas of the public domain along the line or lines of such proposed railroad or railroads for town-site purposes as he may from time to time designate.

Terminal and station grounds and rights of way through the lands of the United States in the Territory of Alaska are hereby granted for the construction of railroads, telegraph and telephone lines authorized by this Act, and in all patents for lands hereafter taken up, entered or located in the Territory of Alaska there shall be expressed that there is reserved to the United States a right of way for the construction of railroads, telegraph and telephone lines to the extent of 100 ft. on either side of the center line of any such road and 25 ft. on either side of the center line of any such telegraph or telephone lines,

and the President may, in such manner as he deems advisable, make reservation of such lands as are or may be useful for furnishing materials for construction and for stations, terminals, docks, and for such other purposes in connection with the construction and operation of such railroad lines as he may deem necessary and desirable.

SEC. 2. That the cost of the work authorized by this Act shall not exceed \$35,000,000, and in executing the authority granted by this Act the President shall not expend nor oblige the United States to expend more than the said sum; and there is hereby appropriated, out of any money in the Treasury not otherwise appropriated, the sum of \$1,000,000 to be used for carrying out the provisions of this Act, to continue available until expended.

SEC. 3. That all moneys derived from the lease, sale, or disposal of any of the public lands, including townsites, in Alaska, or the coal or mineral therein contained, or the timber thereon, and the earnings of said railroad or railroads, together with the earnings of the telegraph and telephone lines constructed under this Act, above maintenance charges and operating expenses, shall be paid into the Treasury of the United States as other miscellaneous receipts are paid, and a separate account thereof shall be kept and annually reported to Congress.

SEC. 4. That the officers, agents, or agencies placed in charge of the work by the President shall make to the President annually, and at such other periods as may be required by the President or by either House of Congress, full and complete reports of all their acts and doings and of all moneys received and expended in the construction of said work and in the operation of said work or works and in the performance of their duties in connection therewith. The annual reports herein provided for shall be by the President transmitted to Congress.

RAILWAY CONSTRUCTION IN THE SAHARA.—The French have nearly completed a line of railway from Biskra to Touggourt, an important oasis in the Desert of Sahara, about 577 miles south of Algiers. This line is a branch of the projected Trans-Sahara railway. It is expected that the first locomotive will have reached Touggourt before the end of March.

RAILWAY CONSTRUCTION IN COLOMBIA.—The Congress of Colombia has approved a project for the construction of a railway from the Gulf of Darien to Medellin, the second city in Colombia and the center of its richest gold and silver district. Some time ago, the government granted a concession to Henry G. Granger, and his American associates for the construction of this line. The company began the work of establishing a port on the gulf, called Ciudad Reyes, and constructed a short stretch of track from the sea coast into the swampy lowlands, but the project was given up in 1908. The new law provides that the government shall send engineers to make a preliminary survey, at its own expense, and that the Department of Antioquia, of which Medellin is the capital, shall provide three engineers to accompany them. On the completion of the railway from Puerto Berrio, on the Magdalena river, to Medellin, the national government will grant the department of Antioquia, if it decides to continue the road to the Gulf of Darien, a subvention of \$25,000 per mile for the mileage constructed. It will also cede to the department 250 acres of public land for each kilometer of line constructed. If the department does not wish to build the line, the national government may make a contract with a company that may be formed therefor, but the contract will have to be approved by the national congress and the Antioquia assembly. The national government also has the right to construct the railway line itself, if it can be constructed in no other way. The same law also makes the subvention applicable to the proposed line from Tunja, in the province of Boyaca, to the Magdalena river, provided this line be constructed with a gage not less than one yard wide. There is, at the present time, a 100 mile line from Bogota to Tunja. The new line will probably pass near Bucaramanga and follow the surveys of the partly constructed Puerto Wilches Railway.

Rebuilding 275 Miles of Milwaukee's Line in Iowa

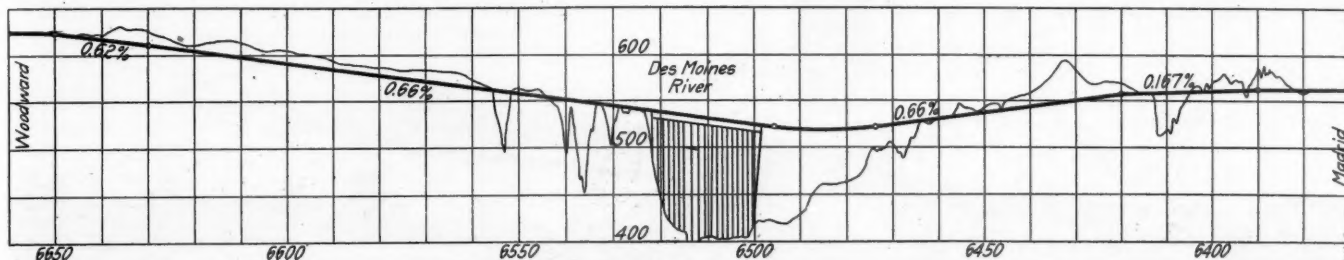
Double Tracking, Reducing Grades and Improving
Alinement at a Total Cost of Over \$18,000,000

It is unusual for a railway company to double track a 275-mile section of line in two seasons. Such a task is still more unusual when the improvement includes radical changes of grade and line and requires the handling of large quantities of earth-work and the building of numerous large bridges. The Chicago, Milwaukee & St. Paul has not only practically completed a second track on its main line across Iowa within the last two years, but has reduced the old maximum grades of 0.67 per cent and 1.0 per cent. on the different engine districts to 0.5 per cent and 0.66 per cent., respectively. Over 1,000 ft. of rise and fall have been eliminated, the old standards of curvative of 4 deg. and 6 deg. have been reduced to a 1 deg.

Manilla and go north from there on the Sioux City line to North Pacific coast points and the Orient. The Sioux City traffic has so added to the congestion east of Manilla that that point was made the objective in the present work, although in the near future the double track will probably be carried through to Council Bluffs. The completion of the present work will give the Milwaukee a continuous double track from Chicago to Manilla, 427 miles.

TRAFFIC

There are from five to eight passenger trains each way per day on this line, with extra sections three or four days a week. The freight traffic averages from 10,000 to 15,000 tons per day



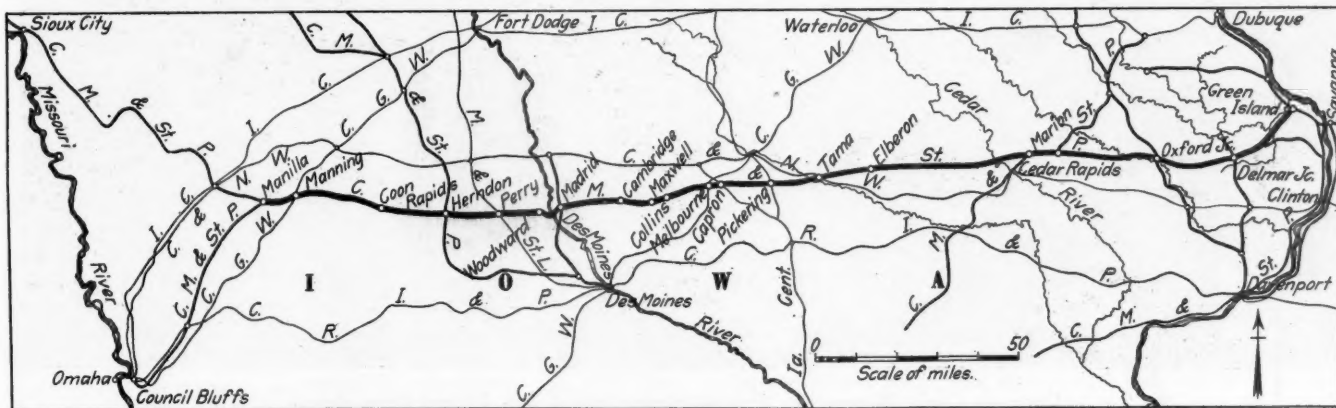
Profile of the Relocated Line Between Madrid and Woodward Crossing the Des Moines River

30 min. maximum; 3,230 deg. of central angle have been eliminated; 15¾ million yards of material have been handled and 52 grade crossings have been eliminated at a total cost of over \$18,000,000. The present article covers only the general features of this work and the details of the grading operations. The important bridge work and the yard development at Perry will be described in later issues.

The improvements which are now nearing completion extend from Green Island, Iowa, on the Mississippi river 15 miles west of Savanna, Illinois, to Manilla, Iowa, 62 miles east of Omaha, a total distance of 275.7 miles on the old line

each way and is handled by 10 to 15 trains each way. At least 50 per cent. of this traffic is time freight. During the construction work the number of trains was materially increased by the large number of work trains, although a considerable amount of business normally handled over this line has been diverted to other lines of the company to relieve the congestion which is, of course, aggravated during the progress of such improvements.

The work covers three engine districts, with intermediate terminals located at Marion and Perry. The old maximum grade in each direction was 0.67 per cent. east of Marion and 1.0 per cent. on the other two sections. On the equated system



Portion of the Chicago, Milwaukee & St. Paul, Showing the Main Line in Iowa Which Has Just Been Double Tracked

and 271 miles on the new. This line forms a part of the Milwaukee's main line from Chicago to Omaha, over which is handled, in addition to the local traffic between those points, a through passenger service to the Pacific coast in connection with the Union Pacific and the through freight which is transferred to the Harriman lines at Council Bluffs and Omaha. The branch lines on this division also produce considerable traffic which moves over sections of the main line on which the improvements have been made. Probably the heaviest movement of this kind consists of shipments from Kansas City, which use the main line from Marion to

of engine rating used by the Milwaukee, the heaviest engine on this division, a Mikado with a total weight of 275,000 lb. and a tractive effort of 50,600 lb. could pull 2,100 tons east of Marion and 1,680 tons between Marion and Perry or west of Perry, assuming an average weight per car of 40 tons. The revised grades which limit the maximum to 0.5 per cent. east of Marion, 0.66 per cent. between Marion and Perry, and 0.5 per cent. west of Perry will allow the same engines to haul 2,950 tons east of Marion, 2,400 tons between Marion and Perry, and 2,950 tons west of Perry, assuming the same average car weight as above. In addition to this increase in engine loading, the helper service,

which was necessary on the old line between Coon Rapids and Manilla and between Madrid and Woodward, will be eliminated. The reduction in train delays which will be effected by the second track is difficult to estimate in advance, but as a result of the placing in service of those portions of the line that were ready up to October 1, 1913, four crews out of 50 on the west end had been taken off. The handling of traffic on the new line will be further facilitated by the installation of automatic block signals for the entire distance.

GENERAL FEATURES OF THE WORK

There are no well defined east and west valleys in Iowa and the country is sharply rolling or broken for almost the entire width of the state. For this reason the early east and west

fore the undertaking of the present comprehensive improvement.

All grading work has been done under contracts, which as a rule covered only short sections. There were 27 general contracts between Green Island and Manilla, which were let to 13 contractors. Work was begun in the spring of 1912 and was pushed as fast as possible during that season, nearly half of the estimated yardage having been moved by January 1, 1913. Very little grading work was carried on through the winter except in the rock cuts near the east end. The work was taken up again the next spring with equal vigor with the result that the new double track was placed in service last fall between Lost Nation and Elberon 80.6 miles and between Capron and Coon Rapids 86.4 miles, a total of about 167 miles, and the grading for the sections between Coon Rapids and Manilla 32 miles, be-



Dumping Cable Making the West Approach Fill to Des Moines River Bridge

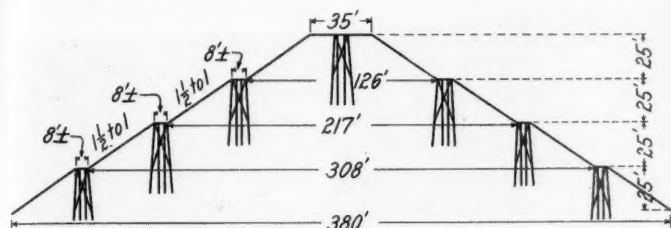
lines across this state were built with heavy grades and considerable curvature. In the improvement work that has been done by the Milwaukee on this portion of its line, the old location has been followed very closely, although in some cases where the reduction of grades on the old location would have been too expensive a revised location was adopted. About 135 miles of the line improved in the last two years is on the old location and about 125 miles is on a new location. The line between Savanna and Marion was rebuilt in 1899 and 1900. In 1901 surveys were made and estimates prepared for similar improvements between Marion and Perry. This work was carried on a little at a time in succeeding years and had already reached as far as Haverhill be-

tween Green Island and Lost Nation 32 miles and between Elberon and Capron 40 miles was finished, so that track could be laid during the winter.

The contracts for grading provided for three classifications of material, no overhaul being allowed on steam shovel work and only in some of the contracts for team work. As an indication of the amount of equipment employed by the various contractors in pushing this work, the summary shown in the accompanying table is of interest. These figures were selected at random for months in which the work on the various sections was under way, so that the total shown is probably higher than would have been secured by taking a total count in any one month. This

summary shows 55 steam shovels; 105 locomotives; 1,283 cars; 331 wheelers; 512 scrapers; 49 grading machines; 4 drag lines, and 520 wagons.

All concrete was placed and track was laid by company forces. The large amount of work involved in handling traffic during such an extensive improvement made it advisable to divide the Chicago and Council Bluffs division at Marion and place a second superintendent at Perry in charge of the line west of Marion. The track laying and ballasting was handled by three roadmasters,



Cross Section of Approach Fill to Des Moines River Bridge Showing Three Level Trestle Method

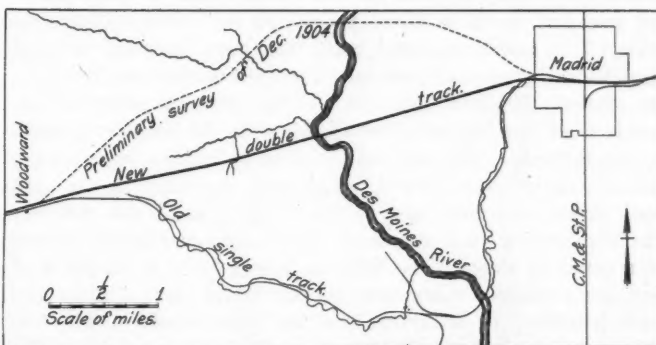
each with an assistant, who also handled the regular maintenance work of their respective districts.

The new track is being laid with 90-lb. A. R. A. section A rail, replacing 85-lb. A. S. C. E. section rail on the present line. Weber and Bonzano rail joints were used and 2,300 P. & M. rail anti-creeper were used per mile of track. All curves are tie plated. The gravel ballast used on the new track was secured from a number of pits, the principal ones being located a short distance north of Sabula, just north of Marion, at Springfield and at Philidia on the Des Moines river. At the Sabula pit the ballast is loaded by contract. As much as 105,000 yd. per month was removed from this pit when a night shift was used. Hart convertible and a few Haskell & Barker cars were used for hauling.

All grades are compensated 0.04 per cent. per degree of curve and all curves sharper than 30 minutes are spiraled with a cubic curve figured on a maximum speed of 60 miles per hour. This spiral has a length of 200 ft. for a 1-deg. and 300 ft. for a 1-deg.

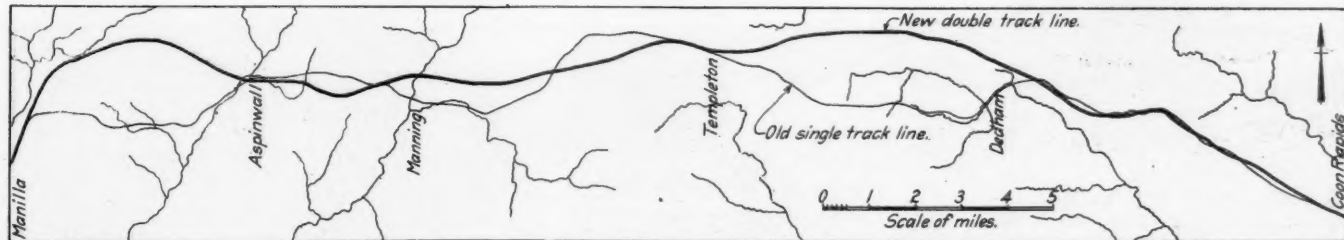
necessary only to eliminate curvature. The saving in rise and fall on this 39 miles was 115 ft. and in curvature, 342 deg. 39 min. The grading amounted to about 2,400,000 cu. yd., of which 310,000 yd. was rock. The total cost on this section was about \$2,000,000.

Just west of Green Island some slight channel changes in the Maquoketa river were necessary and considerable rip rap was placed to protect the new embankments. These channel changes were made by drag line machines. Another channel change was made in Sugar creek near Riggs, which necessitated the placing of one-half mile of rip rap. This channel change eliminated four crossings of the stream. A slight revision in line and a heavy reduction in grade were made near Riggs, the new line crossing over the old at an elevation about 38 ft. above the old grade. The line through Delmar Junction is on a new location a short distance from the old, undergrade crossings being pro-



Relocation of Line Between Madrid and Woodward Crossing the Des Moines River

vided at two streets. West of Delmar Junction a new double track is built alongside and parallel to the old line. The new grade rises at the maximum rate from both directions toward Delmar Junction, passing the summit in a cut 60 ft. deep. Just west of Elwood an alignment change a little over 4½ miles long and entirely on tangent replaced seven curves, saving 153 deg. of central angle in this distance. A number of 30 and 40-ft. cuts were required near this point. Three grading machines



Relocation Between Coon Rapids and Manilla

30-min. curve. Passing tracks are 3,500 ft. long on 0.66 per cent. grades and 4,000 ft. long on 0.5 per cent. grades.

In order to complete the work as rapidly as possible, very careful supervision was provided for in the organization of the engineering department in charge of the work. An assistant district engineer was located at Marion to keep in close touch with the entire improvement and see that the district engineer and general officers in Chicago were always informed of matters requiring their attention. The line was divided into five districts, each in charge of an assistant engineer, the length of these districts varying from 31.8 miles to 81.5 miles. Each of these districts was divided into three or four residencies varying in length from about 5 miles to about 13 miles.

FIRST DISTRICT

The first district, from Green Island to Oxford Junction, about 39 miles, was divided into three residencies. On this district the amount of second tracking and the amount of new double track were about equal, the revisions in line being usually slight and

operated by steam traction engines or teams were used on this district.

SECOND AND THIRD DISTRICTS

The second district, extending from Oxford Junction to Elberon, a distance of 76.2 miles, was divided into four residencies. More than three-quarters of the work on this district consisted of laying second track on the old location as the grades and curvature on the line west of Marion were revised several years ago. Practically no change was made in the amount of rise and fall and there was only a comparatively small saving in curvature. The grading on this district was very much lighter than on the others, although the Cedar river bridge, which is included in this section, raises the total cost to \$2,670,000, which is higher than the nature of the work would indicate. The line was already double tracked between Marion and Martelle, a distance of 12.5 miles, before this improvement began.

The third district, extending from Elberon to Madrid, was 81.5 miles long, a little less than 50 per cent. of this being on new location. A saving of 175 ft. was effected in the rise and

fall; 672 deg. of curvature were eliminated, and a little over 4,000,000 cu. yd. of material handled, the total cost being \$3,750,000. The heavy character of the work on this section is shown by the fact that 13 steam shovels were required and also several large team outfits. At the east end of this district the alinement was revised in 1906 and the present work consisted simply in double tracking. Work between Tama and Dunbar, 10.5 miles, was very light and for most of the distance from Dunbar to Haverhill, 9.5 miles, the old cuts and fills have been widened to carry the second track. At Capron the Iowa Central is cross. From Capron to Melbourne, 2.5 miles, the work is not unusually heavy, but between Melbourne and Collins a very radical change in line is made with a slight improvement in grade. On one portion of this new line a 1-deg. 30 min. curve replaced reverse 6-deg. and 5-deg. curves. Some very heavy cuts and fills are required on this revision and at some places the new line is 15 to 20 ft. above the old. From Collins to Maxwell, 5 miles, a second track has been laid and through Maxwell the grade has been raised and the streets carried under the tracks. Between Maxwell and Huxley, 11 miles, a new double track line has been built, leaving the old location as much as one-half mile. The maximum change in location comes about opposite the town of Elwell, which will necessitate a new station. About two miles east of Cambridge considerable difficulty was encountered in a cut about 55 ft. deep and 5,000 ft. long on account of slides. The material was a fairly good grade of clay, but contained many sand pockets which started slides and made it difficult to determine how the slopes would stand. The estimate showed about 700,000 yd. in this cut, but considerably more than this had to be removed to make the slopes permanent. The grade through Cambridge is considerably higher than the old line and two subways have been built to carry streets. This fill is about 9,500 ft. long and contains 700,000 cu. yd. The remainder of this district had very light work. Two railroad grade crossings were eliminated on this district, one with the

Madrid and Woodward, 7.5 miles, on the old line, where it crosses the Des Moines river. A new location was made between these points, which saves 2.2 miles in distance, 800 deg. of curvature and 200 ft. in rise and fall. The river is crossed about 3.5 miles north of the old crossing on a high steel viaduct with very heavy earth fill approaches. The east earth approach, with a height of not more than 105 ft., was made by trestling in



General View of the Sugar Creek Fill on the First District

four lifts. The first trestles were built near the outer toes of the slope and were spaced 308 ft. apart. After filling, the banks so formed were widened by spreading until the trestles for the second lift could be erected on the new bank 217 ft. apart. The widening was continued on both the first and second lifts until the third pair of trestles were erected 126 ft. apart, and when the fill was finished to the top of these trestles a single line



The East Approach Fill to the Des Moines River Bridge Made by Three Level Trestles

Rock Island at Cambridge and one with the Fort Dodge, Des Moines & Southern at Huxley.

FOURTH DISTRICT

The fourth district, extending from Madrid to Coon Rapids, 47.3 miles, included the heaviest work on the line. About 40 per cent. of the length was on a new location, which saved 305 ft. in rise and fall and 808 deg. of curvature. The grading quantities totaled about 4,200,000 cu. yd. and the total cost was approximately \$7,000,000. These figures include the new engine terminal at Perry.

The heaviest single piece of work on the entire line is between

was erected on the center line from which the bank was widened to 35 ft. The completed fill has a bottom width of 380 ft., the slopes being 1.5 ÷ 1 with 8-ft. berms at the top of each lift. By concentrating the work of spreading at one end of the fill it was possible to carry on several of the operations simultaneously, as shown clearly in one of the accompanying photographs. This fill contained approximately 1,500,000 cu. yd. The west approach fill, which was about 100 ft. high, was made by a dumping cable having a total length of about 600 ft.

From Perry to Dawson, 6 miles, a new double track line with reduced grades has been built, and from Dawson to Herndon, 6½ miles, the grades have been reduced and the second track

was laid on the old location. At Herndon the Des Moines division crosses the main line where a small yard was located west of the crossing to handle transfers. On account of the change in grade at the crossing it was impossible to keep this yard open during the improvement work, so that a new yard was built east of the crossing and the buildings have been moved or duplicated. The yard consists of about 10 tracks 4,000 ft. long. The crossing is controlled by an interlocking plant which has been somewhat enlarged in connection with this improvement work. West of Herndon the grades are being reduced on the old line and temporary tracks were installed to carry the traffic during the progress of the work. From Bayard to Coon Rapids, about 6 miles, a new double track line was built. The maximum curve on the district between Madrid and Coon Rapids is one deg.

FIFTH DISTRICT

The fifth district, extending from Coon Rapids to Manilla, 31.8 miles, is entirely on a new location, which leaves the old line as much as 1.75 miles. The grading quantities on this line totaled about 3,300,000 cu. yd. and the cost was approximately \$2,750,000. The saving in curvature was 1,248 deg. and in rise and fall 422

and all of the material in the new cut has been removed, so that when the change is made it will only be necessary to tear out the temporary structure on which traffic is now being carried.

The summit cut on this district is about 75 ft. deep and contained 321,000 cu. yd. of material. One of the features of the grading was the large amount of material handled by team outfits. In one case a 90,000-yd. cut was removed entirely by teams and in another case four adjoining cuts aggregating 119,400 yd. were removed by two team outfits. As an example of the effect on grading of the numerous crossings of the old line, it was necessary in one case to waste 74,000 yd. and widen a big cut to make a fill of an equal amount where a haul of three miles had been figured on in laying the grade line. To make this haul it would have been necessary to cross the operated main track six times and it proved to be cheaper to waste and borrow than to make so many crossings. One 70-ton steam shovel working in this section with 12-yd. standard gage cars handled an average of about 2,000 yd. a day.

The entire improvement work on the Chicago & Council Bluffs division was handled under the direction of C. F. Loweth, chief engineer, and A. G. Holt, assistant chief engineer. W. E. Wood

TABULATION OF INTERESTING FIGURES ON MILWAUKEE'S IMPROVEMENT

	Districts					Total
	First	Second	Third	Fourth	Fifth	
Length of line, miles—						
Old	38.9	76.2	81.5	47.3	31.8	275.7
New	38.1	76.2	80.5	45.1	31.1	271.0
Difference	0.8	0.0	1.0	2.2	0.7	4.7
Length of new second track, miles.....	18.7	46.53	42.9	26.1	0.0	134.23
Length of new double track, miles.....	19.4	16.7	37.3	19.0	31.08	123.05
Saving in rise and fall, ft.	115	14	175	365	422	1,031
Maximum grades, per cent.—						
Old	0.776	0.776	1.0	1.0	1.0	.....
New	0.5	0.5	0.66	0.66	0.5	.....
Difference	0.276	0.276	0.34	0.34	0.5	.....
Curvature, maximum—						
Old	4°	4°	6°	6°	4°	.....
New	1° 30'	1° 30'	2°	2°	1° 30'	.....
Difference	2° 30'	2° 30'	4°	4°	2° 30'	.....
Central angle—						
Old	1,091° 17'	960° 56'	1,241°	964° 57'	1,762°	6,020° 10'
New	749° 38'	801° 41'	569°	156° 35'	514°	2,790° 54'
Difference	342° 39'	159° 15'	672°	808° 22'	1,248°	3,230° 16'
Quantities of grading, cu. yd.....	2,337,665	1,774,192	4,035,496	4,229,000	3,329,400	15,705,753
Contractor's equipment—						
Steam shovels	9	6	13	18	9	55
Locomotives	21	7	30	20	27	105
Cars	224	98	337	300	324	1,283
Wheelers	11	68	52	200	...	331
Scrapers	238	25	39	150	60	512
Grading machines	3	9	12	17	8	49
Drag lines	2	2	...	...	...	4
Wagons	46	67	92	250	65	520
Grade crossings eliminated .....	...	...	...	...	...	52
Total cost	\$2,000,000	\$2,671,000	\$3,750,000	\$7,000,000	\$2,750,000	\$18,171,000

ft. In some places the new location is very close to the old, the reduction in curvature making a large number of crossings. In one section of nine miles, just west of Coon Rapids, the new grade crosses the old seven times and in all cases at a different elevation, making the handling of the grading very complicated. The change in grade varies at the different crossings, in one case the new line being as much as 26 ft. above and in another 12 ft. below the old tracks. Practically all of the crossings are on a very small angle, 19 deg. being the maximum, which still further adds to the difficulty during construction. In cases where a construction trestle built at the level of the new grade would not have allowed the necessary clearance over the old line, a temporary construction trestle was built at a grade which would provide this clearance with long run-offs to enable the contractor's trains to make the crossing. No material tracks were allowed to cross the main line at grade, so that this solution was practically the only one available under the circumstances without extremely heavy waste and borrow. At two places where the new grade is below the old, temporary framed bents on piles have been used to carry the old tracks

is the district engineer, located in Chicago, and E. L. Sinclair the assistant district engineer at Marion. The assistant engineers beginning at the east end are: F. H. Haskell, J. F. Young, John Osmond, G. S. Stayman and D. C. Fenstermaker. B. F. Van Vliet was the superintendent at Marion until December 1 and C. H. Marshall is at Perry.

DONT'S FOR STATION AGENTS.—While delivering a lecture on railway work in India before the London School of Economics, E. C. Godfrey, agent of the Bengal-Nagpur Railway, introduced the following anecdote: A European entered the booking office of a small station, where European passengers were not very common, and asked for a ticket. The Indian stationmaster replied with very scant civility that he was busy and the passenger must wait a bit. In a few minutes the stationmaster was told by one of his staff that the government inspector of railways was on the platform; he looked around the corner and realized it was the passenger. Rushing up to him obsequiously he poured forth his apologies and concluded with, "Oh, sir, please excuse. I thought your honor only an ordinary passenger."

ELECTRIC LOCOMOTIVES' FOR THE PIEDMONT & NORTHERN LINES

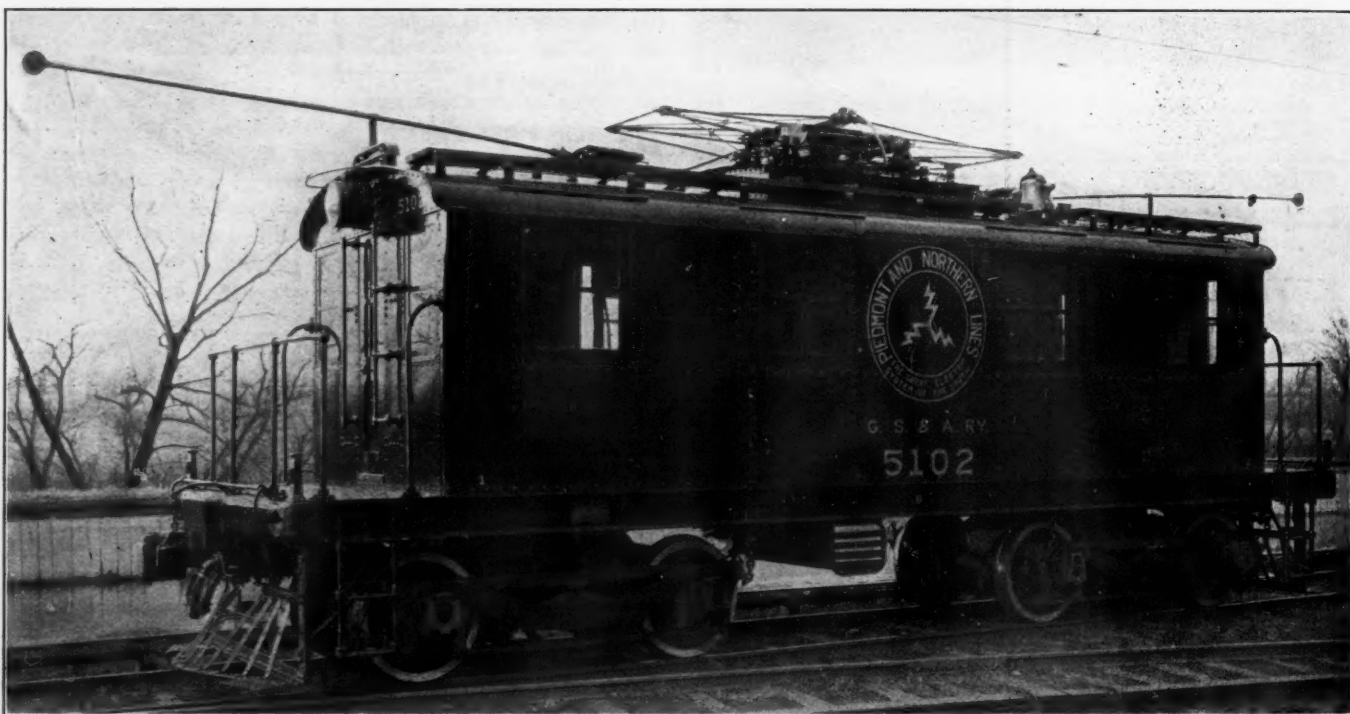
The Piedmont & Northern Lines are placing in commission six new 1,500 volt direct current electric locomotives on the Greenville, Spartanburg & Anderson division of the system. These locomotives weigh $63\frac{1}{2}$ tons, with all the weight on drivers, have the box type of cab extending nearly the entire length of the underframe and are designed for heavy freight service. At the normal rating of the four motors, with which each locomotive is equipped, operated on 1,500 volts, two in series, they will develop a tractive effort of 17,500 lb. and a speed of 21 miles per hour. The locomotives will handle trains of 800 to 1,000 tons gross weight.

The Piedmont & Northern Lines comprise two main divisions, which when entirely completed will embrace 280 miles of track. One division, operated by the Piedmont Traction Company, extends from Charlotte, N. C., to King's Mountain, N. C. There are 23 miles of this road in operation at the present time between Charlotte and Gastonia, but the remaining 12 miles from Gastonia to King's Mountain are yet to be constructed. The other division, operated by the Greenville, Spartanburg & An-

The new locomotives were designed and built by the General Electric Company. In the interior the cab is open as far as is consistent with the apparatus located therein. While the operating mechanism is grouped in the central section, it is not located in a compartment separate from the engineman's operating cabs. Convenient passageways run along each side and connect with the operating positions in each end.

The underframe consists of four 10 in. steel channels extending the entire length of the platform. These channels are tied together by heavy end frame box girder castings and bolster plates, each channel being riveted to the webs of the end frame castings and to the top and bottom bolster plates. The bolsters are built up of 18 in. by 1 in. plates, the top bolsters being carried clear across the platform and riveted to all four longitudinal sills. The two center channels are enclosed throughout with steel plates riveted to the sills and carrying the center castings, which are bolted to them. The space between the center sills serves as a reservoir for distributing air from the blowers to the motors. Openings in the floor of this reservoir admit air from it through suitable intake pipes to the back end of each motor.

The two four wheel trucks are of the swivel type, designed for



Electric Locomotive for the Piedmont & Northern Lines

derson Traction Company, extends from Greenwood through Greenville to Spartanburg, S. C., and joins the northern division at King's Mountain. Ninety-five miles of this road are now in operation from Greenwood to Spartanburg, including a ten mile spur running from Belton to Anderson. The section between Spartanburg and King's Mountain is also yet to be closed, and with the northern gap through to Gastonia leaves about 50 miles of the system yet to be built.

All these lines operate on 1,500 volts direct current. Energy is purchased from the Southern Power Company and is delivered from the transmission lines to two substations for the Piedmont Traction Company, one in Charlotte and the other in Gastonia. On the southern division of the road there are four substations, one three miles south of Spartanburg, one at Greenville, one at Belton, and one at Downs, which is three miles out of Greenwood. The lines have a very heavy freight traffic and transport great quantities of cotton from shipping points to mills along the route, and in turn fabric from the mills to connecting stations for distribution to distant markets.

heavy freight work, and conform to M. C. B. standards. The wheels are solid rolled steel, 36 in. diameter, and the axles have $5\frac{1}{2}$ in. by 10 in. journals. The air brakes are the combined straight and automatic type.

The locomotive is driven by four GE-212 F, 600-1,200 volt box frame commutating pole motors, insulated for operation on 1,500 volts. Each motor is geared to an axle. The gear ratio is 65 to 18, making 3.61 gear reduction. The continuous capacity of each motor is 200 amperes under forced ventilation, and 269 amperes at the one hour rating. For the complete equipment of four motors on a locomotive this is equivalent to a continuously sustained tractive effort of 11,200 lb. at the rail.

The GE-212 motor is enclosed and is designed especially for locomotive service. Through the method of forced ventilation employed, air is circulated over the armature and field coils, over and through the commutator, through longitudinal holes in the armature core, and thence exhausted through openings in the bearing head.

The control equipment is the Sprague-General Electric Type M multiple unit control, arranged to operate the four motors in series and series-parallel connections. The transition between series and series-parallel is effected without opening the motor circuit, and there is no appreciable reduction in tractive effort during the change. This smooth transition between control points permits operating the motors close to the slipping point of the wheels throughout the entire range of acceleration without sudden fluctuations of tractive effort.

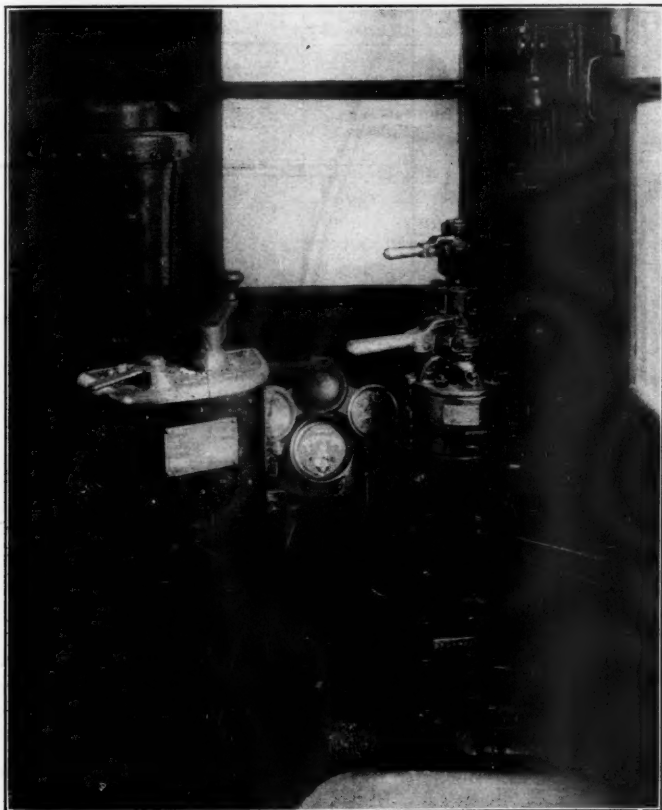
One of the distinctive features for a locomotive of this type is the convenient manner in which the apparatus is arranged in the central section of the cab so as to afford ready access to all parts for inspection, cleaning, adjustment or repair. The main motor rheostat boxes are mounted in banks in an enclosed sheet steel compartment in the cab center. This compartment extends from the floor to the roof and is accessible through doors opening into the passageways on each side. The floor in the compartment is open and it is surmounted by an open monitor deck. Thus there is a continuous draft of air rushing up through the compartment while the locomotive is running, affording exceptionally good ventilation.

The blower set for ventilating the motors has a capacity of 2,000 cu. ft. per minute, and is driven by a series-wound motor of the railway type. Air is taken from the exterior through a suction box with side louvers underneath the platform at the center. Current at 600 volts for the operation of the blower,

the current for the auxiliary control and supply circuits is obtained direct from the trolley circuit. This change-over switch is protected by an automatic relay, which makes it impossible to connect 1,500 volt trolley current to the auxiliary circuits of the locomotive.

The following are the principal data and dimensions:

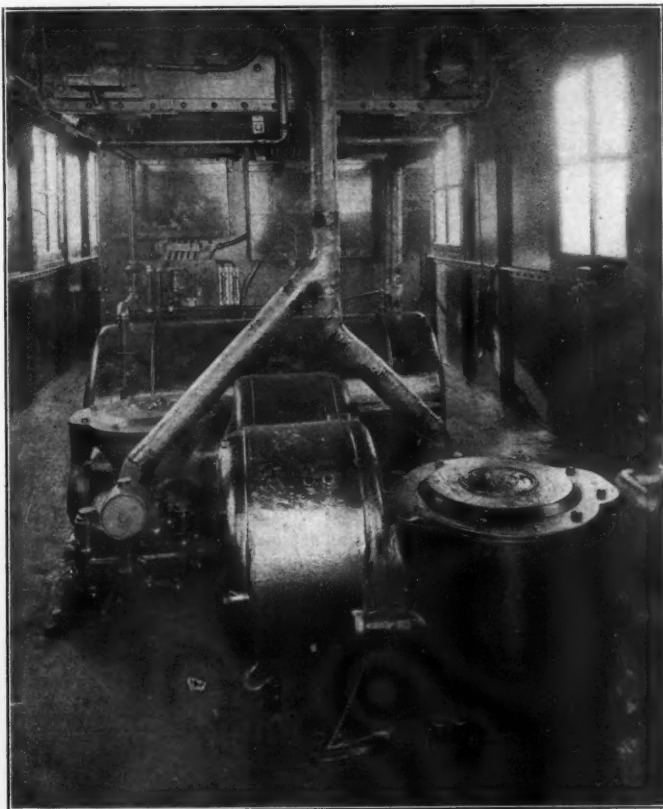
Length inside of knuckles.....	37 ft. 4 in.
Length over cab.....	27 ft.
Height to trolley base.....	13 ft.
Width over all.....	9 ft. 7 in.



Interior of the Engineman's Cab

and also the air compressors, the contactors and the light, is furnished from a two fifths tap taken from the dynamotor.

Current is collected by an overhead pantograph trolley, which is pneumatically controlled. On some of the local lines which form the system, the overhead construction is not adapted for the pantograph trolley, and in order to operate over such lines, the locomotives are equipped with pole type trolleys and trolley wheels. Some of these local lines are operated on 600, and in some cases as low as 500 volts direct current. A change-over switch is installed for cutting out the dynamotor while the locomotive is operating on low voltage circuits, so that in such cases



Location of the Apparatus at One End of the Cab

Total wheel base.....	26 ft. 8 in.
Rigid wheel base.....	7 ft. 2 in.
Track gage.....	4 ft. 8½ in.
Tractive effort at 25 per cent. coefficient.....	30,000 lb.
Tractive effort at one hour rating.....	17,500 lb.
Tractive effort at continuous rating.....	11,200 lb.
Weight per driving axle.....	31,750 lb.
Weight of electrical equipment.....	37,500 lb.
Weight of mechanical equipment.....	89,500 lb.
Total weight on drivers.....	127,000 lb.

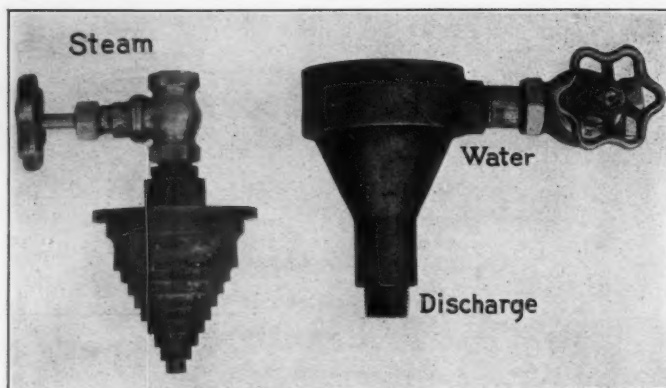
COLD WATER HEATER

A method of heating cold water at the point of delivery by steam, which is known as the Starwal system, has been placed on the market by Warner-Reiss Sales Company, St. Louis, Mo. The type B valve, which is illustrated, and which handles water in large quantities, may be found of advantage in engine houses for boiler washout work or with concrete mixers, where large quantities of hot water are required. The amounts of cold water and steam are regulated by separate valves so that any degree of temperature may be readily obtained. The construction of the type B heater is such that no sediment will collect in the valve itself. The steam is admitted through a conical step shaped casting perforated with small holes. This casting fits in a conical casting into which the cold water is admitted. The construction is such that any sediment that may collect on the delivery side of either the steam valve or the water valve will be readily washed out through the discharge.

Care should be taken in applying the valve so that the base of the conical casting will be on top. The steam as it comes through the small perforations in the conical casting mixes

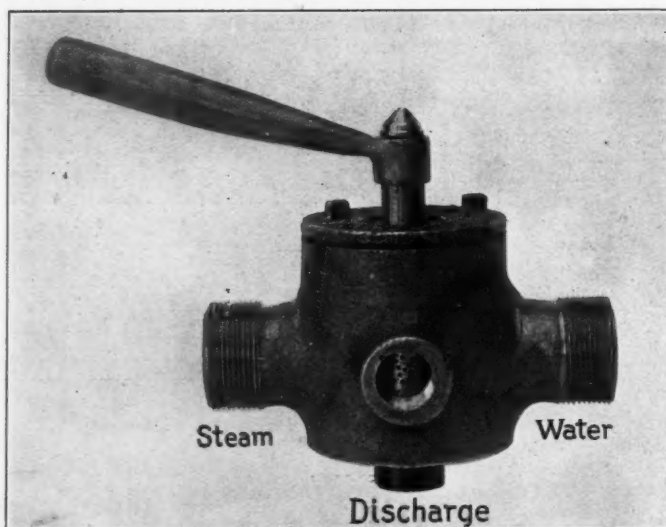
thoroughly with the water, heating it instantaneously to any degree of temperature desired. It obviates the necessity of maintaining large reservoirs for hot water. These heaters are made of cast iron and are adapted for all sizes of standard pipes.

One of the illustrations shows the Starwal heating valve, which is operated on the same principle as the Starwal heater.



Type B Starwal Cold Water Heater

As the steam and water enter the valve they strike baffle plates and become thoroughly mixed. In this valve both the water and steam are controlled by a single handle. The first quarter turn of the handle discharges plain cold water; the second quarter, warm; and the third, hot. The first quarter turn opens the water valve, the second partly opens the steam connection and holds the water valve open, the third partly



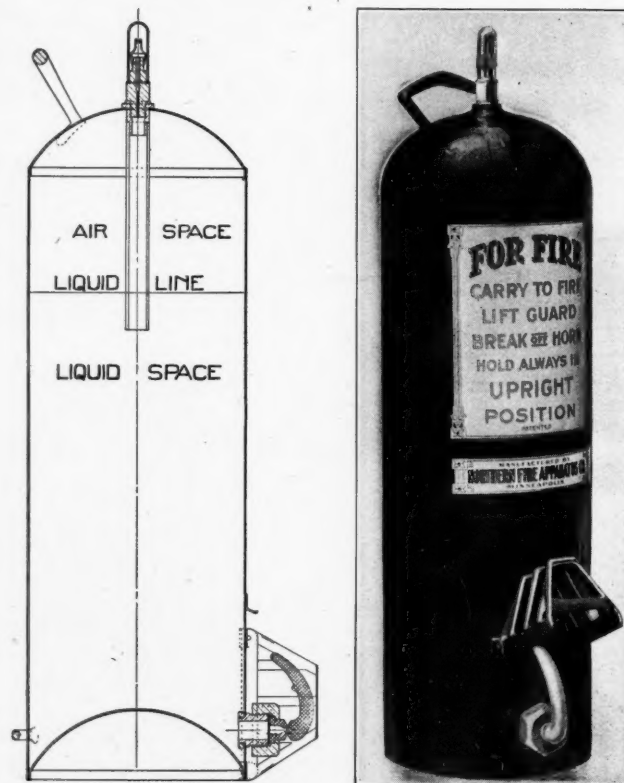
Starwal Heating Valve

closes the water valve and opens the steam valve entirely. This valve will be found of advantage in lavatories where hot and cold water are desired for washing purposes. It is also applicable to toilet rooms in cars, where the steam may be taken direct from the steam-heating lines.

ENGLISH CITY PLANS TO PURCHASE OMNIBUS LINE.—The city of Birmingham, Eng., is now considering the purchase from the Birmingham & Midland Motor Omnibus Company of about 30 omnibuses, a garage and connected facilities for about \$165,000. If this plan is carried out, the city will have a monopoly of the motor omnibus service within its boundaries. The company will still be allowed to run omnibuses into the city from outside points, and on the other hand, the city may run omnibuses into the country, but neither is to pick up any but through passengers within the limits of the other's activities.

FIRE EXTINGUISHER

The illustrations show a portable fire extinguisher which is adapted for use in railway service. These extinguishers are made of steel and are charged with a chemical consisting of a calcium chloride solution filled to a height shown in the drawing as the liquid line. Compressed air is then applied through the special Schrader air valve, the air passing down through the brass tube which extends below the liquid line and provides a liquid seal to the air valve. To operate, the horn shaped lead nozzle at the bottom of the tank is broken off, the shield first being raised. This makes a clean cut opening into the tank and the air pressure will force the liquid out for a distance of 25 ft.



Fire Extinguisher Operated by Air Pressure

To fill the tank the liquid is poured through the spug at the bottom and a new lead nozzle is applied. The compressed air is pumped in through the valve at the top, a gage being used to determine the correct amount of pressure. The air may be pumped in with a standard tire pump. This air valve also permits of frequently testing the air pressure by means of a standard tire tester. If any leak should occur in the air valve and thereby reduce the required pressure the liquid would be forced up through the valve, clearly indicating that it was not properly seated. The lead horn is protected by the nozzle guard, which is shown raised in the photograph. This extinguisher is made by the Northern Fire Apparatus Company, Minneapolis, Minn.

THE WARMEST RAILWAY STATION IN AFRICA.—One of the stations on the newly opened railway from Bandolier Kop to Messina, in the Northern Transvaal, which traverses a region in which great heat is frequently experienced, has been given the name "Ottazel." An English contemporary, reporting the fact, remarks that the orthography only thinly veils the opinion of the individual by whom the designation was bestowed as to the salubrity of the climate. This idea of appropriateness in names is something that might be looked into by American railway officers. It might be well in case of any suggested changes to secure the approval of the community involved, however, so as to avoid possible complications.

General News Department

The paint and coach shops of the Wabash at Moberly, Mo., and ten coaches were destroyed by fire on March 9.

At the shops of the New York, New Haven & Hartford at Readville, Mass., 500 men have been suspended from March 11 to April 1, because of a necessity to reduce expenses.

E. H. Morton, president of the Order of Railroad Station Agents, has laid before the Massachusetts legislature, a proposed bill calling for one day's rest in seven for station agents, telegraphers and signalmen.

Orville F. Berry, examiner attorney of the Interstate Commerce Commission, addressed the regular monthly meeting of the St. Louis Railway Club on March 14, on the subject, "Past and Present Railroading."

The general offices of the engineering, accounting and freight claim departments of the Chicago & Eastern Illinois have been moved from 7700 Wallace street, Chicago, to the new three story building at 6600 Union avenue.

The Gulf, Colorado & Santa Fe has ordered a hospital car costing \$10,000, which will be kept at Cleburne, Tex. The car is to be fitted up with an operating room and equipped to take care of from fifteen to twenty patients at one time.

On the Chicago & North Western at Manlius, Ill., March 13, robbers who tried to steal freight from a train standing near the station, shot and killed the engineman and wounded two deputy sheriffs; and one of the robbers was killed.

The passenger and freight station of the Louisiana Railway & Navigation Company at Baton Rouge, La., was destroyed by fire March 14; estimated loss, including contents of the building, \$11,000. An officer of the road says that a new brick building will be put up to replace the old one.

The Pennsylvania Railroad last year paid out \$5,143 on account of accidents to passengers who tripped over other passengers' grips placed in the aisles on passenger trains. That is one of the reasons why its trainmen are instructed not to permit luggage to remain in the aisles of passenger coaches.

The United States Civil Service Commission will hold examinations April 24 and 25 in numerous cities for the positions of inspector of safety appliances and inspector of hours of service. It is expected that several appointments will be made at \$1,800 a year. Applicants must be 25 years old, but not over 50.

A bill has been introduced in Congress by Representative Gillett of Massachusetts to prohibit the free transportation of private cars by railroads in interstate commerce. Under the terms of the bill no interstate railroad would be allowed to haul any private car belonging to other corporations or individuals without charging for such transportation the rate of fare charged for hauling cars for the public generally.

A wage controversy between the Oregon-Washington Railroad & Navigation Company and its telegraph operators has been settled after mediation by G. W. W. Hanger, assistant commissioner of the Board of Mediation and Conciliation. About 170 men are affected. Some slight increases in pay were agreed upon and "split tricks" were abolished; but the refusal of the road of the demand that all station agents be promoted from among the operators was sustained.

The annual report of the director of the Bureau of Standards, department of commerce, has just been issued. The bureau has made investigations of electrolysis and the damaging effects of earth currents on gas and water pipes. Studies of commercial steels have added knowledge regarding impurities. Steam, vacuum and air gages and special instruments have been tested in large numbers both for the government and for private concerns. Metals, cements, lime, stone, clay products, paint materials, paper textiles, rubber and leather represent some of

the materials tested by the bureau and reported on in circular No. 45.

"Observations," or surprise tests, were made on the Pennsylvania Railroad during 1913 to the number of 5,961,732; with 8,120 failures, showing a record of 99.9 per cent. perfect. These tests included many things besides obedience to signals, such as employees reporting late; smoking on duty, using the locomotive whistle unnecessarily, leaving headlight burning in day time, using foot to adjust couplers, going between cars to repair leak in air hose without notifying train crew, placing torpedoes where persons are liable to be injured by them, and the use of unreliable watches. The observations made as to the use of intoxicants by employees numbered 784,675; and only 158 cases required discipline.

As heretofore announced, the American Museum of Safety awarded to the Southern Pacific Company the Harriman medal for the best safety record for the year 1913. There were three medals, one gold, one silver and one bronze, and the three representatives of the company designated to receive them came to New York, March 14, for the presentation ceremonies. Julius Kruttschnitt, chairman, received the gold medal; William Sproule, president, the silver medal, and William Schwab, a conductor on the company's lines in California, received the bronze medal. Mr. Schwab was selected by the officers as the employee who had made the most useful suggestions concerning "Safety First" during the year.

The fire which destroyed the passenger station of the New York, New Haven & Hartford at Hartford, Conn., Saturday afternoon, February 21, about 3 o'clock, burned so rapidly that the train despatchers in the building had time only to save their train sheets, and the ticket sellers saved only their money, the tickets being burned up. One of the train despatchers resumed his work, at a signal tower, within about thirty minutes, and another went to the main office of the Western Union Company. A despatcher's office was established in the office of the superintendent of the Central New England in about five hours after the fire began. Officers of the road reached the scene from New Haven in about one hour and soon had six special trains moving towards Hartford carrying men and equipment. Lumber for a new temporary station was on the ground within five hours, and by 9 p. m. 150 carpenters were at work. At midnight, the emergency boarding train served dinner to 350 workmen. The debris was sufficiently cleared away so that by 10:30 p. m., the tracks had all been again put in service; and at 7 o'clock on Monday morning, a new temporary station, 30 ft. by 150 ft., steam heated and electric lighted, was opened to the public. A new supply of tickets was printed in Boston on Sunday.

Disastrous Collision in Australia

A press despatch of March 14 from Temora, New South Wales, reports a collision between a passenger train and a freight at Exeter, on the line between Sydney and Melbourne, in which 10 passengers were killed and 15 injured. There was a dense fog at the time.

Opposes Special Charge for "Spotting" Cars

The National Industrial Traffic League is sending to all its members a circular letter regarding the hearings before the Interstate Commerce Commission on special services, containing a copy of resolutions adopted at its meeting on February 25 asking the commission to defer consideration of the subject until after an extended investigation, and urging all shippers to petition the commission to refrain from definitely and finally concluding this matter until such time as a "full hearing, after due and adequate notice and with respect to the territory in which the shippers are located, has been given." The circular states that:

"The league is unanimously of the opinion that "transportation"

includes all of the railroad service and tracks and facilities devoted to the hauling of freight traffic, and that the published freight rates now include and always have included full compensation for these services. A departure from this long established practice, requiring the carrier to add to the present freight rate a separate charge for receipt and delivery of freight, will deprive the shipper of the value of his investment in terminal facilities and transfer it to the carrier.

"It is needless to emphasize the fact that if the charging for these so-called special services is established as a principle in Official Classification territory it will inevitably be applied in all sections of the country."

Locomotive Note

[Washington Despatch to The New York Evening Post.]

You have seen, of course, a big railroad switching yard, with all the tracks filled with loaded freight cars, waiting to be shunted out on the main line, made up into trains and sent to their destination. Well, in a way of speaking, that is the situation and condition in Washington now. The trouble is, there is only one switch engine to handle all the waiting cars. It may be called the "Woodrow Wilson." It is overworked.

Just now the attempt is to get the Mexican problem and the repeal of the Canal tolls exemption clause pushed out on the main line and finally disposed of. Until this is accomplished, virtually everything else must wait. This applies particularly to the President's program of anti-trust legislation. This legislation does not move and apparently will not move until President Wilson can take personal charge of it and apply propulsive motive power. The members of the house who are charged with the duty of framing the anti-trust bills remind one of nothing so much as little boys kept in after school to work out problems in algebra, which they do not understand.

Railroads Extend Losses in January

To carry a total traffic \$8,995,000 smaller than in the corresponding period the year before, 143 of the largest railways of the United States during the first seven months of the current fiscal year have been obliged to pay out in operating expenses an increase of \$48,611,000. The resulting loss in net is \$57,606,000, according to a statement issued by the Bureau of Railway News and Statistics from preliminary figures of the Interstate Commerce Commission for January. The returns here covered aggregate 197,097 miles, or approximately 79 per cent. of the total mileage of the country.

From July 1, 1913, to January 31, 1914, these railroads made the following showing, compared with the corresponding seven months a year ago:

	1914	1913	Increase or Decrease
Gross	\$1,606,528,000	\$1,615,523,000	Dec. \$ 8,995,000
Expenses	1,126,565,000	1,077,954,000	Inc. 48,611,000
Net	479,963,000	537,569,000	Dec. 57,606,000

Lehigh Valley Discipline

According to a report concerning the administration of discipline on the Lehigh Valley, only eight men, out of 6,000, have been discharged, as a matter of discipline, during the last 2½ years. There are no suspensions. When an employee's demerit marks reach a total of 90 he is discharged, unless the general manager decides to give him another chance. This occasionally has been done. Any employee who gets drunk or is a frequenter of saloons is discharged at once. According to a published statement of an officer the road is so strict on the subject of drinking that would-be drinkers keep away from it. Credit marks are given for good service, the effect of which is to balance mistakes by alertness. The company furnishes a button reading "Clear Record, Safety Always," which is issued to clear-record men by the Lehigh Valley. To get this a man must be sober and on the job. This button has come to be a badge of honor. More than two-thirds of all engineers, firemen, conductors, trainmen and baggagemasters on the road wear these buttons.

Michael Johns and Peter Curran have been running locomotives for 19 and 18 years, respectively, without once being disciplined. William H. Rex and Daniel Farren, enginemen, on the New Jersey and Lehigh division, have long and good

records. Rex has served 44 years and has been called to time but once. Farren has served 43 years and has never been disciplined.

John S. Fritzinger and Thomas Fink, enginemen, John Kern, trainman, and Daniel Hughes have unusual records.

New England Railroad Club

At its annual meeting and dinner on March 10, the New England Railroad Club elected the following officers: President, H. E. Astley, roadmaster N. Y. N. H. & H.; vice-president, P. M. Hammett, supt. of motive power, Maine Central; secretary, William E. Cade, Jr.; treasurer, C. W. Sherburne, Boston; finance committee, H. E. Astley, B. M. Jones and F. A. Barbey; executive committee, H. E. Astley, P. M. Hammett, C. W. Sherburne, C. B. Breed, associate professor, M. I. T., W. J. Cunningham, assistant to the president, N. Y. N. H. & H., George W. Wildin, mechanical superintendent, N. Y. N. H. & H.; E. W. Holst, supt. of equipment, Bay State Street Railway; W. C. Kendall, supt. of car service, B. & M.; J. B. Hammill, supt., B. & A.; F. A. Ryer, purchasing agent, B. & A.; J. D. Tyter, general superintendent, B. & M.; L. J. Morphy, designing engineer, B. & A.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 5-8, Hotel Pontchartrain, Detroit, Mich.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass. Convention, May 19, St. Louis.
- AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, 143 Liberty St., New York.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill. Next convention, April 21, Houston, Tex.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, St. Louis, Mo.; 3d Thursday and Friday in May.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 29 W. 39th St., New York.
- AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOC.—H. G. McConaughy, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.
- AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Karpfen Building, Chicago. June 15-17, Atlantic City, N. J.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga. Next convention, July 20-22, Hotel Sherman, Chicago.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa. Next annual meeting, June 30 to July 4, Hotel Traymore, Atlantic City, N. J.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 West 57th St., New York; 1st and 3d Wed., except June and August, New York.
- AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wenlinger, 11 Broadway, New York; 2d Tuesday of each month, New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. June 16-19, St. Paul-Minneapolis, Minn.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, Highland Park, Ill. Annual meeting, June 24, Minneapolis, Minn.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md. Next convention, May, St. Paul, Minn.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago. Next convention, May 20-23, New Orleans, La.
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Annual meeting, Hotel Chalfont, Atlantic City, N. J., June 18-19.
- ASSOCIATION OF WATER LINE ACCOUNTING OFFICERS.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y.
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit, Graphite Co., Detroit, Mich. Meeting with American Railway Bridge and Building Association.
- CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and August, Montreal.
- CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursday, Montreal.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.
- CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Fri. in Jan., May, Sept. and Nov. and 2d Thurs. in March, Hotel Statler, Buffalo, N. Y.
- CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after second Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. H. Hiles, Oliver building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va. Next convention, May 13, Hotel Galvez, Galveston, Tex.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, 922 McCormick building, Chicago. Annual convention, May 18-22, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 West Broadway, Winona, Minn. Next convention, July 14-17, Hotel Sherman, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Next convention, third Tuesday in August.

MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Next annual meeting, May 25-28, Hotel Walton, Philadelphia.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Karpen building, Chicago. June 10-12, Atlantic City, N. J.

MASTER CAR & LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 8-11, Nashville, Tenn.

NATIONAL RAILWAY APPLIANCE ASSOC.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3rd Friday in month, except June, July and August, New York.

NORTHERN RAILROAD CLUB.—C. L. Kennedy, C. M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria; 2d Thursday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Mobile & Ohio, Mobile, Ala. Annual meeting, 1st Tuesday in October.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo.

RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa. New York, June 9. Annual meeting, Bluff Point, N. Y., September 22.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio. Next convention, May 18-20, Hotel Raleigh, Washington, D. C.

RAILWAY SUPPLY MANUFACTURERS' ASSOC.—J. D. Conway, 2135 Oliver bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. Assocs.

RAILWAY TELEGRAPH & TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Assoc. of Ry. Teleg. Supts.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Next convention, September 8-10, 1914, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, 519 Boston building, Salt Lake City, Utah; 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Next convention, June 16, Jacksonville, Fla.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, August, Chicago.

UTAH SOCIETY OF ENGINEERS.—Fred D. Ulmer, Oregon Short Line, Salt Lake City, Utah; 3d Friday of each month, except July and August.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen building, Chicago; 3d Tuesday of each month, except June, July and August, Karpen building, Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Monday in month, except July and August, Chicago.

Traffic News

An officer of the Wells-Fargo Express says that the reduction of rates for the transportation of merchandise has already caused an increase in the volume of traffic on that company's lines.

The refugees from Mexico who flocked into Texas in January, and who were carried about 200 miles over the Southern Pacific from Marfa, Tex., westward to El Paso, numbered 4,848. They were carried in six trains, occupying two days, each train carrying, including the military guards, about 880 persons.

The State Freight Rate Association is a recently organized association of shipping interests in South Carolina. It has appeared before the railroad commission of the state with a petition making a general demand for "just, reasonable and non-discriminatory" freight rates. It is claimed that rates in that state are higher than in North Carolina.

The postmaster general announces that the parcel post will accept packages of butter, eggs, fruits, etc., when weighing over 20 lb. and up to 50 lb., in boxes and crates, similar to those used when shipping by express. Heretofore articles were required to be in a form suitable to be put into the mail bags. For packages weighing 20 lb. or less, the old rule is continued in force.

The National Railways of Mexico report that the company's lines are open to Tampico, Laredo and Eagle Pass. This is the first time in some months that all three of these gateways have been open at one time. The main line is now in operation through from Laredo to Mexico City. The resumption will make possible the shipment of a large amount of cotton that has been held back for some months and should materially increase gross earnings.

The United States Express Company

The directors of the United States Express Company, at a meeting in New York City, March 13, voted to wind up the company's affairs and go out of business. The company is said to have 15,000 employees, 2,000 of which are in New York City. An officer of the company says that it would have been possible to withstand the competition of the parcel post as originally planned, but as the government service is now expanded the express business becomes unprofitable. The company operates over the Baltimore & Ohio, the Chicago, Rock Island & Pacific and other roads, the whole aggregating 32,000 miles of line. The contract with the Baltimore & Ohio is said to be valued, as an asset, at \$416,000. The total assets of the company, according to its balance sheet on June 30, 1913, were \$14,248,641. Of these there are about \$8,000,000 in quick assets, of which more than \$5,000,000 are in high grade securities. The surplus is \$1,186,895. The company owns large office buildings in New York and in Chicago. The president of the company is D. I. Roberts, formerly general passenger agent of the Erie Railroad.

Traffic Club of Pittsburgh

The annual dinner of the Traffic Club of Pittsburgh is to be held in Memorial Hall on Friday, March 27. The speakers will be: Elmer C. Sattley, president of the club; Daniel Willard, president of the Baltimore & Ohio; John Barrett, director general of the Pan-American Union, and Francis Harvey Green, of the West Chester State Normal School.

Car Surpluses and Shortages

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 163, giving a summary of car surpluses and shortages by groups from November 7, 1912, to March 1, 1914, says: The total surplus on March 1, 1914, was 159,480 cars; on February 14, 1914, 199,385 cars, and on March 1, 1913, 58,529 cars.

Compared with the preceding period; there is a decrease of

39,905 cars, of which 12,141 is in box, 1,080 in flat, 19,953 in coal and gondola and 6,731 in miscellaneous car surplus. The decrease in box car surplus is in groups 2 (New York, New Jersey, Delaware, Maryland and eastern Pennsylvania); 3 (Ohio, Indiana, Michigan and western Pennsylvania); 4 (the Carolinas and Virginia); 6 (Iowa, Illinois, Wisconsin and Minnesota); 7 (Montana, Wyoming and the Dakotas); 8 (Kansas, Colorado, Oklahoma, Missouri and Arkansas); 9 (Texas, Louisiana and Mexico) and 11 (Canadian Lines). The decrease in flat car surplus is in groups 1 (New England lines), 2, 3, 6, 8, 11 (as above) and 10 (Washington, Oregon, Idaho, California, Nevada and Arizona). The decrease in coal and gondola car surplus is in groups 1, 2, 3, 6, 7 (as above) and 5 (Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida). The decrease in miscellaneous car surplus is in groups 1, 2, 3, 4, 5, 6 and 11 (as above).

The total shortage on March 1, 1914, was 5,573 cars; on Feb-

ruary 14, 1914, 2,333 cars, and on March 1, 1913, 27,148 cars.

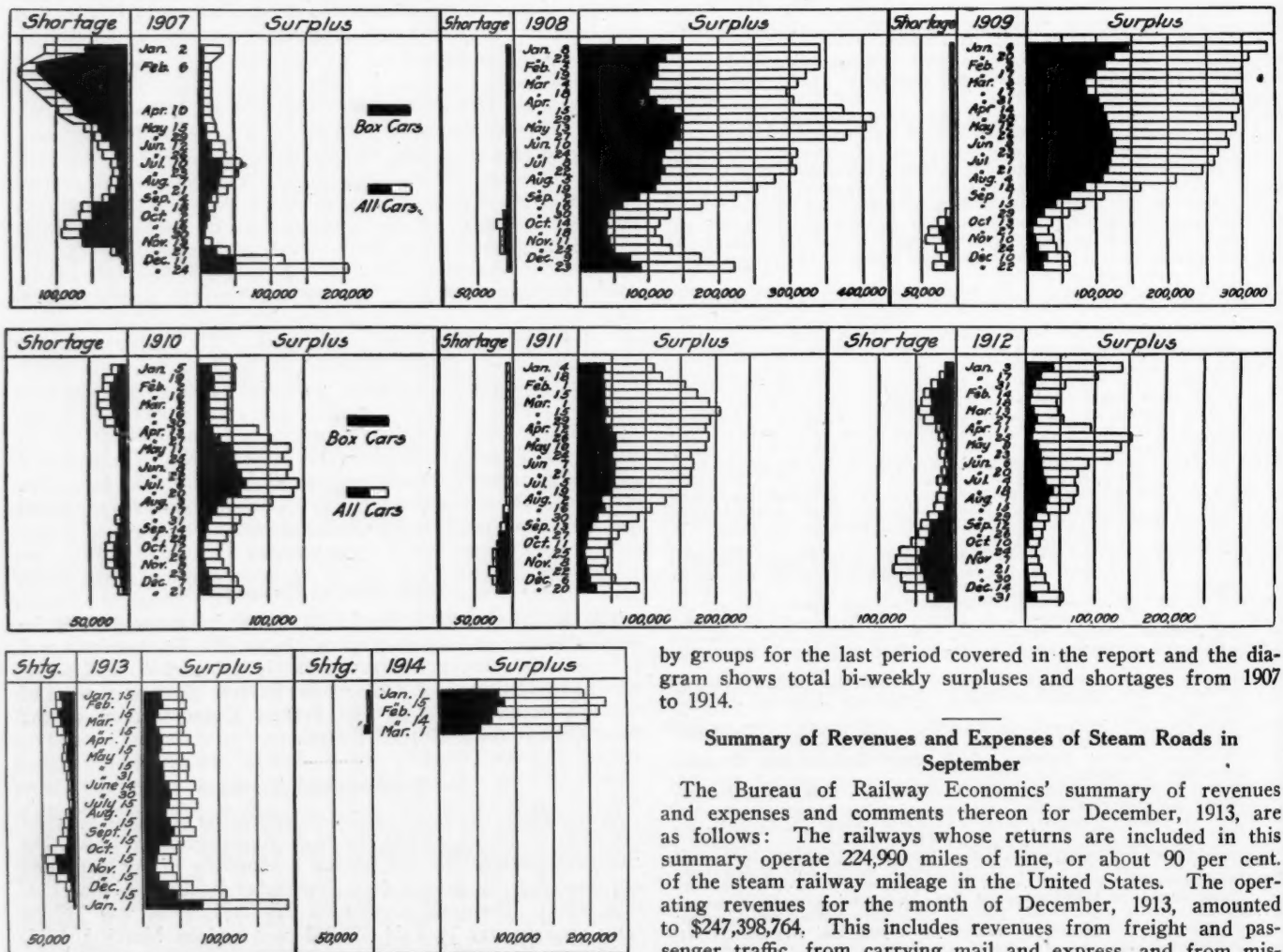
Compared with the preceding period; there is an increase of 3,240 cars, of which 1,585 is in box, 85 in flat, 1,155 in coal and gondola, and 415 in miscellaneous car shortage. The increase in box car shortage is in groups 1, 3, 5 and 6 (as above). The increase in flat car shortage is in groups 1 and 4 (as above). The increase in coal and gondola car shortage is in groups 3, 4 and 5 (as above). The increase in miscellaneous car shortage is in groups 1 and 3 (as above).

Compared with the corresponding period of last year; there is an increase in the total car surplus of 100,951 cars, of which 36,724 is in box, 6,242 in flat, 46,783 in coal and gondola and 11,202 in miscellaneous car surplus. There is a decrease in the total car shortage of 21,575 cars, of which 14,662 is in box, 3,454 in flat, 1,961 in coal and gondola and 1,498 in miscellaneous car shortage.

The accompanying table gives car surplus and shortage figures

Date	No. of roads.	Surpluses				Shortages			
		Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Box.	Flat.	Coal, gondola and hopper.	Other kinds.
Group *1.—March 1, 1914.....	7	0	562	128	35	833	36	0	618
" 2.—" 1, 1914.....	31	1,727	568	12,243	3,045	0	0	0	0
" 3.—" 1, 1914.....	28	4,167	2,196	28,539	2,150	610	0	229	89
" 4.—" 1, 1914.....	11	7,396	1,415	5,372	1,308	0	50	900	30
" 5.—" 1, 1914.....	23	1,678	717	4,543	1,401	165	0	23	0
" 6.—" 1, 1914.....	28	4,881	837	4,019	4,881	1,375	83	42	81
" 7.—" 1, 1914.....	4	173	72	1,517	1,386	0	0	0	0
" 8.—" 1, 1914.....	16	7,441	315	3,289	3,319	0	0	0	0
" 9.—" 1, 1914.....	12	3,090	278	614	1,083	0	0	0	2
" 10.—" 1, 1914.....	22	9,271	2,542	4,558	10,984	0	0	200	200
" 11.—" 1, 1914.....	4	12,867	1,390	0	1,483	0	0	0	7
Total	186	52,691	10,892	64,822	31,075	2,983	169	1,394	1,027

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California, Nevada and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages, 1907 to 1914

by groups for the last period covered in the report and the diagram shows total bi-weekly surpluses and shortages from 1907 to 1914.

Summary of Revenues and Expenses of Steam Roads in September

The Bureau of Railway Economics' summary of revenues and expenses and comments thereon for December, 1913, are as follows: The railways whose returns are included in this summary operate 224,990 miles of line, or about 90 per cent. of the steam railway mileage in the United States. The operating revenues for the month of December, 1913, amounted to \$247,398,764. This includes revenues from freight and passenger traffic, from carrying mail and express, and from miscellaneous sources connected with rail operation. Compared

with December, 1912, the total operating revenues show a decrease of \$11,576,925. The total operating revenues per mile of line averaged \$1,100 in December, 1913, and \$1,160 in December, 1912, a decrease of \$60, or 5.2 per cent. Freight revenue per mile decreased 7.3 per cent., while passenger revenue per mile decreased 0.8 per cent.

Operating expenses, which include all the costs of maintaining track and equipment, operating trains, securing traffic, and of administration, amounted to \$180,086,863. This was \$1,522,631 more than for December, 1912. These operating expenses per mile of line averaged \$800 in December, 1913, and \$799 in December, 1912, an increase of \$1 per mile, or 0.1 per cent.

Net operating revenue, that is, total operating revenues less operating expenses, amounted to \$67,311,901. This was \$13,099,556 less than for December, 1912. Net operating revenue per mile of line averaged \$299 in December, 1913, and \$360 in December, 1912, a decrease of \$61 per mile, or 16.9 per cent.

Taxes for the month of December amounted to \$11,320,885, or \$50 per mile, an increase of 7.2 per cent. over 1912.

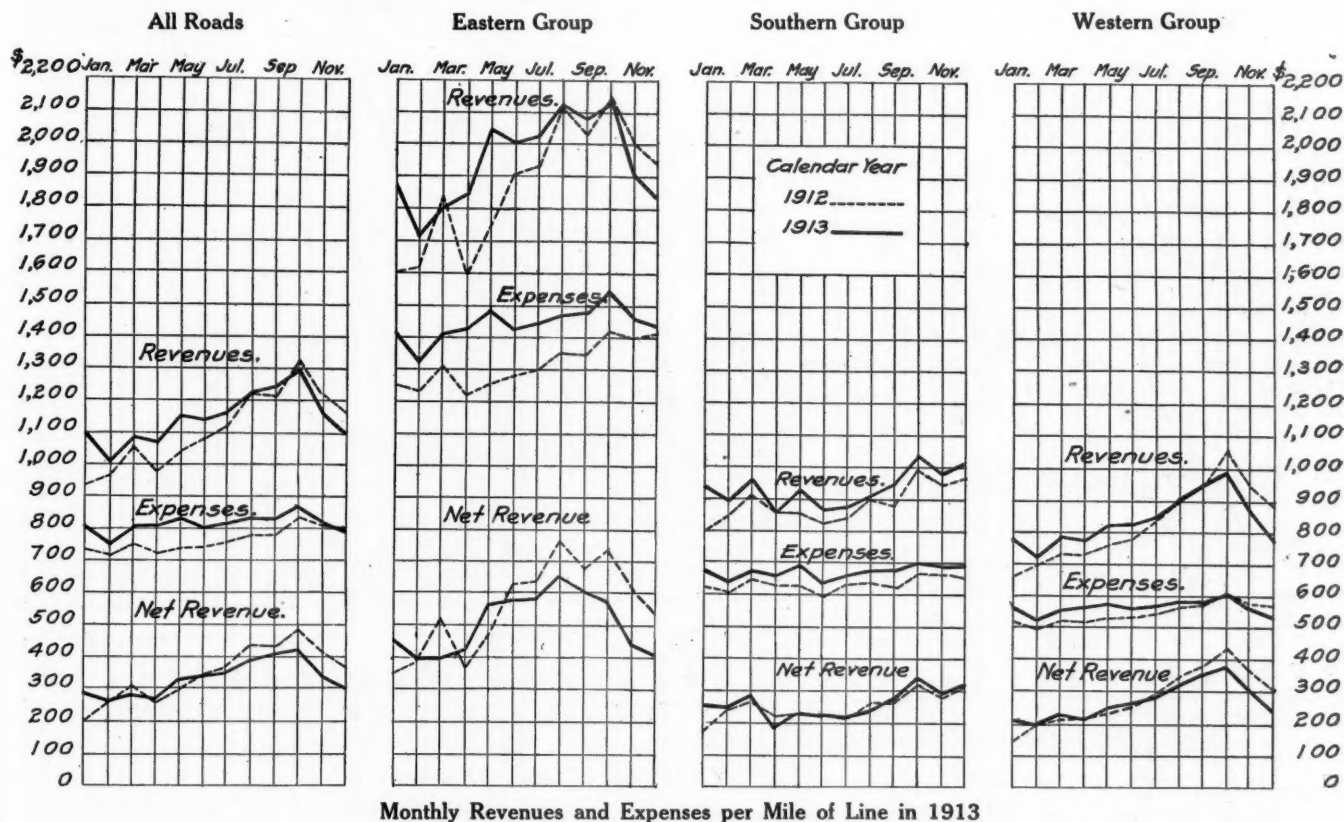
Operating income, which is net revenue from rail and outside operations, less taxes, averaged \$248 per mile of line, and in December, 1912, \$314, thus decreasing \$66, or 21.1 per cent.

mile in the eastern district show an increase of 4.5 per cent., in the southern district an increase of 16.2 per cent., and in the western district an increase of 7.0 per cent. Operating income per mile decreased 29.4 per cent. in the east, increased 3.1 per cent. in the south, and decreased 22.7 per cent. in the west.

Comparison of the returns for the six months of the current fiscal year with those of the corresponding months of the previous fiscal year reveals a decrease in total operating revenues per mile of 0.6 per cent., an increase in operating expenses per mile of 5.0 per cent., and a decrease in net operating revenue per mile of 11.2 per cent. This net operating revenue per mile of the eastern railways decreased 17.1 per cent. as compared with the corresponding period of the previous year, that of the southern railways increased 2.5 per cent., while that of the western railways decreased 9.4 per cent.

Compilation of December returns makes possible a summary of earnings and expenses for railways having total operating revenues of \$1,000,000 and over for the calendar year 1913. These lines operate about 90 per cent. of the steam railway mileage of the United States.

Total operating revenues for 1913 amounted to \$3,075,112,243. This is equivalent to an increase over the previous year of



Monthly Revenues and Expenses per Mile of Line in 1913

Operating income from each mile of line for each day in December averaged \$7.99, and for December, 1912, \$10.12. Operating income is that proportion of their receipts which remains available to the railways for rentals, interest on bonds, appropriations for betterments, improvements, new construction, and for dividends.

The operating ratio for December, that is, the per cent. of total operating revenues absorbed in operating expenses, was 72.8 per cent., which is comparable with 70.8 per cent. in November, 1913, and 69.0 per cent. in December, 1912.

The railways of the eastern district show a decrease in total operating revenues per mile of line as compared with December, 1912, of 4.9 per cent., the railways of the southern district an increase of 5.4 per cent., and the railways of the western district a decrease of 9.2 per cent. Operating expenses per mile increased 2.2 per cent. on the eastern railways, increased 5.8 per cent. on the southern railways, and decreased 4.3 per cent. on the western railways. For the eastern railways net operating revenue per mile decreased 23.8 per cent., for the southern railways it increased 4.6 per cent., while for the western railways it decreased 18.5 per cent. Taxes per

\$485, or 3.7 per cent., per mile of line. Freight revenue per mile increased 3.4 per cent., and passenger revenue per mile 4.2 per cent. Operating expenses amounted to \$2,189,563,930, which was an increase of \$668 per mile, or 7.3 per cent., over the calendar year 1912. Net operating revenue amounted to \$885,548,313, representing a decrease of \$183 per mile, or 4.4 per cent., as compared with 1912. Operating income per mile of line decreased \$239, or 6.6 per cent.

The railways of the eastern district show a decrease in net operating revenue per mile of 9.1 per cent., railways of the southern district an increase of 4.3 per cent., and the railways of the western district a decrease of 2.5 per cent. All three districts show increases in total operating revenues per mile and in operating expenses per mile, but in the eastern and western districts these increased operating expenses more than balanced the increases in revenues. Texas per mile increased 7.7 per cent. in the east, 7.8 per cent. in the south, and 8.9 per cent. in the west. Operating income per mile decreased 12.6 per cent. in the eastern district, increased 4.0 per cent. in the southern district, and decreased 4.0 per cent. in the western district.

The following table shows the per cent. of operating revenues consumed by each class of expenses:

Account	December		Fiscal year ending June 30		Six months ending December 31	
	1913	1912	1913	1912	1913	1912
Maintenance of way and structures	12.0	11.8	13.3	12.7	13.5	12.9
Maintenance of equipment	17.7	16.2	16.4	15.9	16.9	15.4
Traffic expenses	2.1	2.0	2.0	2.1	2.0	1.9
Transportation expenses	38.2	36.5	35.2	35.9	34.5	33.2
General expenses	2.8	2.5	2.4	2.5	2.4	2.2
Total operating expenses	72.8	69.0	69.3	69.1	69.3	65.6

Car Balance and Performance

Arthur Hale, chairman of the committee on relations between railroads, of the American Railway Association, in presenting statistical bulletin No. 164, covering car balances and performances for November, 1913, says:

The committee presents herewith statistical bulletin No. 164,

covering car balance and performance for November, 1913.

The miles per car per day were 25.7, remaining the same as in October. This figure for November, 1912, was 26.0.

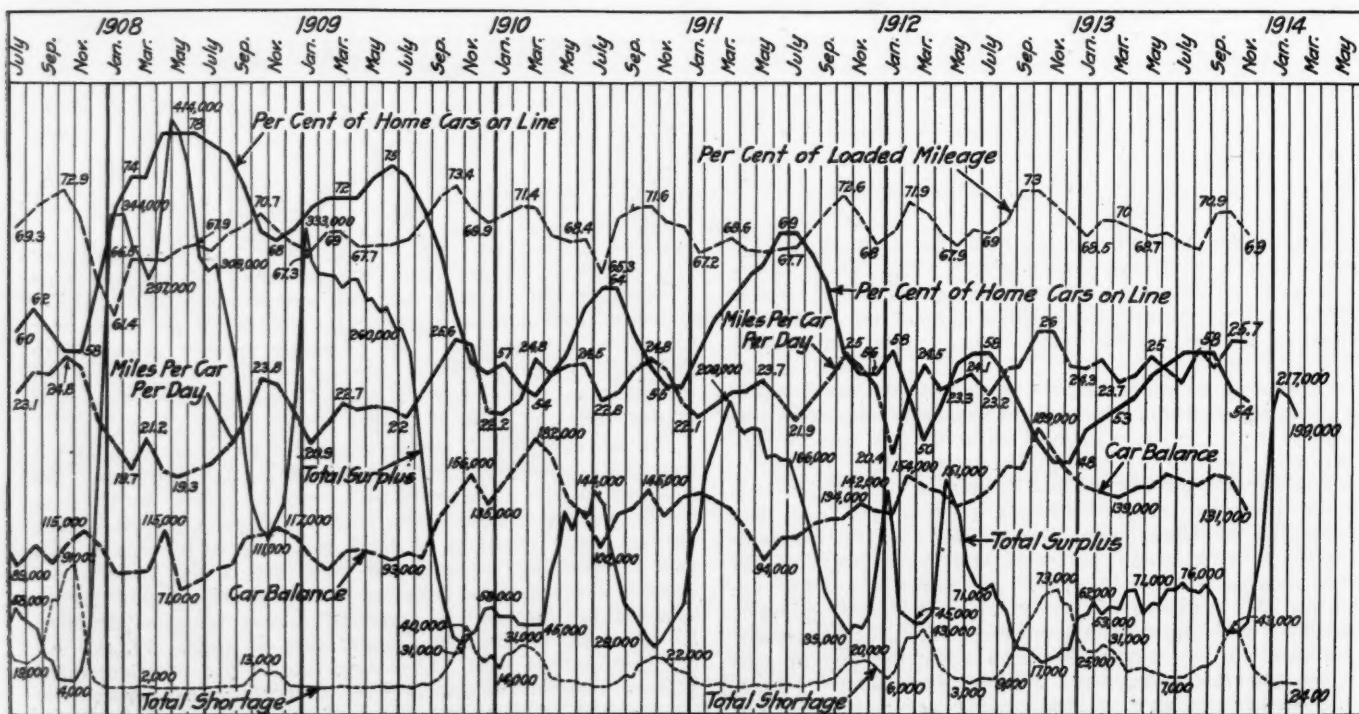
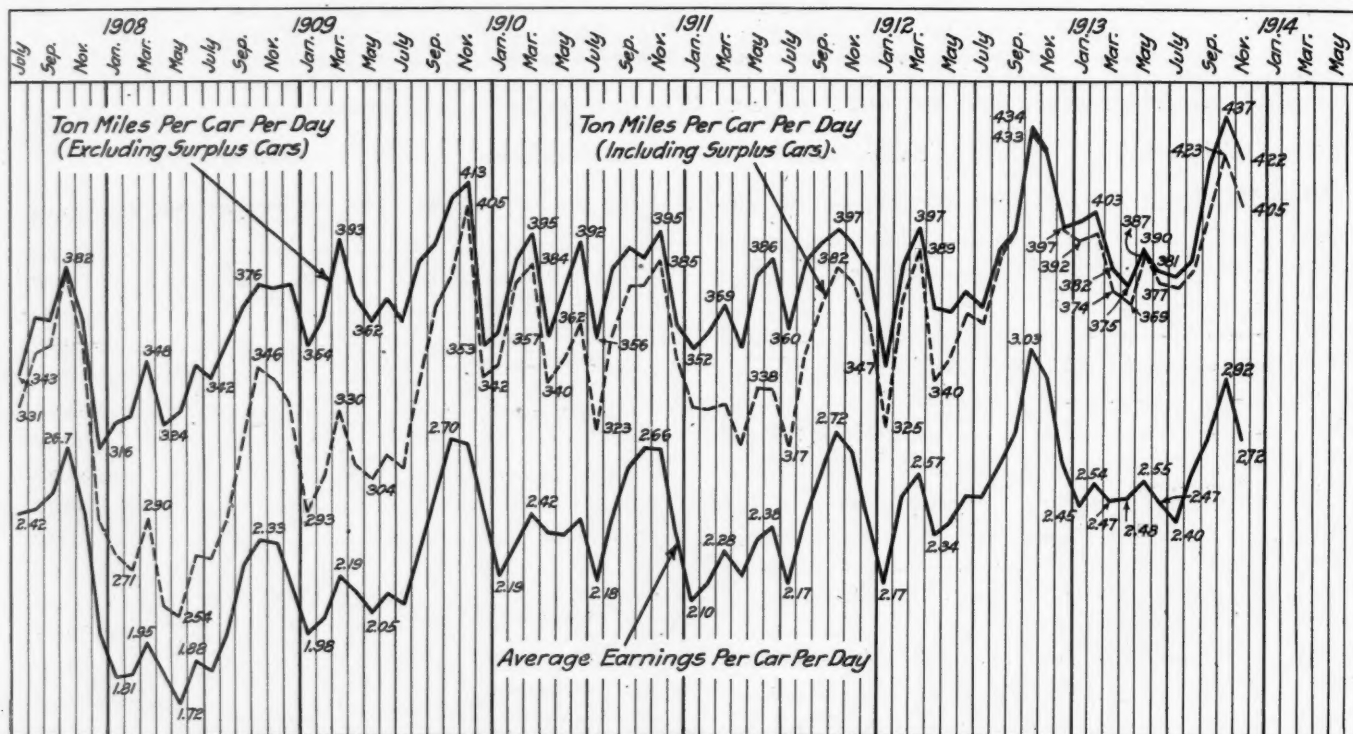
Ton miles per car per day for November were 405, compared with 423 in October. This is a decrease of 4.49 per cent., compared with the figure for 1912, which was 424.

The proportion of home cars on line was 54 per cent., compared with 55 per cent. in October.

The per cent. of loaded car mileage decreased from 70.9 per cent. in October to 69.0 per cent. in November. This figure for November, 1912, was 75.9 per cent.

The average earnings per car per day decreased 20 cents to \$2.72 in November, 1913. This figure for 1912, was \$2.92.

The accompanying table gives car balance and performance in the month covered by the report, and the diagram shows car earnings and car mileage and different car performance figures monthly from July, 1907.



Freight Car Mileage, Earnings and Performance, 1907 to 1914

CAR BALANCE AND PERFORMANCE IN NOVEMBER, 1913

	New England	N. Y., N. J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. and So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kan., Colo., Mo., Ark.	Texas, La., New Mex.	Ore., Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Revenue freight cars owned.....	89,743	702,774	197,066	191,921	166,576	449,000	19,523	145,518	19,344	142,221	171,288	2,294,974
Average number of system cars on line.....	40,534	349,035	112,166	92,440	77,148	303,178	6,094	66,335	14,694	72,265	115,497	1,249,386
Railway-owned cars: Average foreign on line.....	57,291	313,886	102,826	81,339	72,396	167,347	11,140	76,513	22,345	46,609	46,285	997,977
Excess.....	97,825	662,921	214,992	173,779	149,544	470,525	17,234	142,848	37,039	118,874	161,782	2,247,363
Per cent. of cars on line to total owned:.....	8,082	*39,853	17,926	*18,142	*17,032	21,525	*2,289	*2,670	17,695	*23,347	*9,506	*47,611
Home.....	45	50	57	48	46	68	31	46	76	51	68	54
Foreign.....	64	44	52	43	44	37	57	48	115	33	27	44
All railways.....	109	94	109	91	90	105	88	94	191	84	95	98
Private cars on line.....	3,513	33,743	9,454	5,828	10,296	16,572	2,615	10,108	2,148	10,259	2,843	107,379
Total, all cars on line.....	101,338	696,664	224,446	179,607	159,840	487,097	19,849	152,956	39,187	129,133	164,625	2,354,742
No. of freight engines owned.....	654	5,552	10,322	8,338	7,239	5,738	6,462	7,388	7,111	5,133	4,599	6,432
Average cars on line per freight engine owned.....	1,577	10,831	2,998	3,532	2,764	7,233	502	2,938	671	2,879	2,621	38,436
Total freight-car mileage.....	58,941,367	521,700,696	140,487,367	144,760,978	131,642,078	369,802,343	34,080,770	106,767,241	29,381,631	124,719,549	155,103,539	1,817,387,561
Average miles per car per day.....	9.4	25.0	21.0	26.9	27.3	24.8	57.2	24.4	25.0	32.1	31.8	25.7
Per cent. loaded mileage.....	73.6	67.2	69.9	67.5	70.0	69.1	70.0	70.4	69.5	70.8	70.3	69.0
Ton-miles of freight, including company freight.....	699,344,085	8,775,352,360	2,460,708,826	2,349,399,915	1,965,533,176	4,326,185,885	523,443,426	1,530,548,903	339,137,281	1,791,761,663	2,167,754,702	26,929,170,222
Average ton-miles, including company freight:.....	11.9	16.8	17.6	16.2	14.9	15.2	15.4	14.3	11.5	14.6	16.2	15.8
Per car-mile.....	16.1	25.0	25.1	24.0	21.3	22.0	21.9	20.6	16.6	20.6	23.0	22.8
Per car per day.....	230	420	370	436	410	377	879	350	288	469	515	405
Gross freight earnings.....	\$7,397,733	\$49,700,130	\$13,132,765	\$14,302,407	\$13,390,034	\$38,817,710	\$3,713,178	\$13,509,198	\$3,631,270	\$18,497,177	\$15,736,419	\$191,828,021
Average daily earnings: Per car owned.....	\$2.75	\$2.35	\$2.22	\$2.49	\$2.68	\$2.88	\$6.34	\$3.01	\$6.26	\$4.34	\$3.06	\$2.78
Per railroad car on line.....	2.52	2.50	2.04	2.74	2.98	2.75	7.18	3.20	5.19	5.19	3.24	2.85
All cars on line.....	2.43	2.39	1.95	2.65	2.79	2.66	6.24	3.00	3.09	4.78	3.19	2.72

*Denotes deficiency.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission has suspended from March 15 to June 26, a Wabash Pittsburgh Terminal tariff proposing changes in the rules governing transit privileges on grain, feed, hay and straw at Pittsburgh, Pa.

The commission has suspended from March 15 to July 13, certain schedules in a tariff of W. H. Hosmer, agent, increasing rates on potatoes in carloads, from points in Minnesota and Wisconsin to points in Arkansas and other states.

The commission has suspended from March 16 to July 15 tariffs of the Detroit & Mackinac and the Michigan Central proposing to withdraw an allowance of \$5 per car on lumber and \$3.75 per car on forest products loaded in cars and floated across the river by shippers at Cheboygan, Mich., and delivered to the Detroit & Mackinac and the Michigan Central for forwarding.

The commission has further suspended from March 31 to September 30, certain schedules in an Illinois Central tariff increasing the minimum weight on dressed poultry, meats, fish, game and dairy products in refrigerator cars from Chicago and other stations on the Illinois Central, exclusive of St. Louis and East St. Louis, destined to points in Florida and other southeastern states.

The commission has further suspended from March 29 to September 29, certain schedules in tariffs of W. H. Hosmer, agent, F. A. Leland, agent, and Eugene Morris, agent, increasing rates on iron and steel articles, in carloads, including old and new rails, steel cross ties and other articles of that nature between Chicago and other points east of the Mississippi river, to Des Moines, Iowa, and other points west of the Mississippi.

Protection of Potato Shipments in Winter

Opinion by Commissioner Harlan:

The commission finds reasonable a tariff rule that offers a protected service in special equipment for shipments of potatoes in winter at the risk of the carrier for weather damages with the alternative that the shipper may furnish his own protection, but at a lower rate and at his own risk. (29 I. C. C., 504.)

Rates on Steel from Perth Amboy to New England

C. Pardee Works v. Central Railroad of New Jersey et al. Opinion by Commissioner Harlan:

Complaint is made that the rate on scrap iron from New England points to Perth Amboy, and on steel billets and bars from that point to New England are unreasonable *per se* and unduly preferential to competitive plants in eastern Pennsylvania. The commission finds that a breaking up of the New England zone into two or more groups or the reduction in the arbitrary mileage for the ferry service across New York harbor would not necessarily benefit Perth Amboy, since the rates from competitive points would be changed in similar fashion. Nor are the rates from Perth Amboy to New England points found to be unreasonable *per se*. (29 I. C. C., 500.)

Fourth Section Application Denied

Standard Oil Company v. Pennsylvania Company et al. Opinion by the commission:

The commission finds that the rate charged on a carload of iron pipe fittings from Martinsville, Ill., to Whiting, Ind., was not unreasonable. It is held, however, that the maintenance of a rate of 14.5 cents from Martinsville to Whiting, while a rate of 9 cents is charged on the same traffic from East St. Louis to Whiting, is not justified. The fourth section application of W. H. Hosmer, agent, that the continuance of such rates be allowed, is therefore denied. (29 I. C. C., 524.)

Colorado Commodity Rates

Colorado Manufacturers' Association et al. v. Atchison, Topeka & Santa Fe et al. Opinion by Commissioner Harlan:

In a previous report in this case reasonable class rates were fixed between Chicago, Mississippi river and Missouri river rate points on the one hand and Colorado common points on the other. New commodity rates have also been established by the carriers, but complaint is made against many of them by the shippers, and it is contended that the Denver rates put the jobbers there at a disadvantage as compared to those at Salt Lake City. As a present remedy at least, the commission has therefore fixed certain commodity rates as the proper rates to Denver. (29 I. C. C., 544.)

Rates on Tomatoes from Jacksonville, Fla., to Points West of the Mississippi River

Opinion by Commissioner Clements:

The commission finds unreasonable proposed increases in the proportional rates on tomatoes, originating at points on the Florida East Coast, from Jacksonville, Fla., to Kansas City, Mo., and other destinations west of the Mississippi river. (29 I. C. C., 522.)

Rates to North Carolina Points

Opinion by Commissioner Clark:

The carriers in North Carolina, as the result of a compromise and agreement with the Corporation Commission and others representing shipping interests of that state, have proposed to decrease the rates from Ohio river crossings, St. Louis and Memphis to North Carolina points on traffic originating west of the Mississippi river. The decrease will amount to about 10 per cent., and will be brought about by adding to the proportional rates from Cincinnati and Louisville to the Virginia cities certain proportional rates from the latter points to points in North Carolina, approximately 20 per cent. less than the present local rates. The commission finds that the proposed adjustment is reasonable, with the exception that a set of certain proportional rates should be published from Memphis on traffic west of the Mississippi, such proportional rates not to be less than from intermediate points east of the river. (29 I. C. C., 550.)

Unreported Opinions

Colorado Coffee Roasting Company et al. v. Atchison, Topeka & Santa Fe et al.

The rates on green coffee from New Orleans to Denver are not found unreasonable.

Camden Iron Works, et al. v. Southern Railway, et al.

A charge for wharfage and handling at Norfolk Terminals on pig iron originating at Birmingham, Ala., and destined to eastern points, is found unreasonable.

Weinstock-Nichols Co., et al. v. Boston & Maine, et al.

A rate of \$6 per 100 lb. on automobile headlights and searchlights in less than carload lots from points east of the Mississippi to San Francisco and Los Angeles, is not found unreasonable.

Continental Paper Bag Company v. Maine Central, et al.

The charges on certain carload shipments of paper bags from Rumford Falls, Me., to Memphis, Tenn., are not found unreasonable.

Hammond Brothers v. Chicago, Burlington & Quincy.

The commission finds that an arrangement whereby the defendant applies higher minimum weights on carload shipments of ice from Omaha to Kansas City, than are in effect from Ashland, Neb., to Kansas City, results in discrimination.

Trussed Concrete Steel Company v. Erie et al.

The fifth class rate of 34.5 cents on expanded metal in carloads from Youngstown, Ohio, to Marquette, Mich., is found reasonable.

King Collie & Company et al. v. Abilene & Southern et al.

The commission finds that a rate of 56.5 cents on export cotton moving on through bills of lading from points in Texas to Galveston, is not unjustly discriminatory.

S. T. J. Price et al. v. Washington & Old Dominion et al.

The commission finds that the one-way, round-trip, 46-trip and 52-trip monthly commutation fares between Washington,

D. C., and stations on the Great Falls division of the Washington & Old Dominion in Virginia, are not unreasonable.

STATE COMMISSIONS

The hearing in the anthracite rate case will be held by the Pennsylvania Public Service Commission on April 13. The commission will shortly promulgate regulations for testing meters for steam, gas, electricity and water.

PERSONNEL OF COMMISSIONS

F. Herbert Snow, hitherto chief engineer of the Pennsylvania state department of health, has been chosen as chief engineer of the new Pennsylvania Public Service Commission, and will organize a bureau of engineering. Mr. Snow is a graduate of Harvard University and Massachusetts Institute of Technology, and was a member of the firm of Snow & Barbour, of Boston and New York. He was in general engineering practice from 1890 to 1905, and was engaged in work connected with the abolition of grade crossings in Boston.

COURT NEWS

The state of Texas has filed suits against the Missouri, Kansas & Texas Railway of Texas and the Beaumont & Great Northern to recover penalties amounting to \$8,400,000 for alleged violation of the state safety appliance act.

The Kansas City Southern and the Chicago, Milwaukee & St. Paul have filed petitions in the Missouri state courts asking the removal to the federal courts of suits filed by the attorney-general of the state to recover refunds of alleged overcharges collected by the roads during the litigation over the state rate laws.

In the federal court at Shreveport, La., March 12, the Waters-Pierce Oil Company was fined a total of \$14,000, after having been found guilty on fourteen counts of an indictment charging violation of the Elkins law. The company was charged with receiving rate concessions on oil shipments in 1904, 1905 and 1906, from Bixby, Ill., to points south of Alexandria, La. From the record in the case it appears that the carriers published a joint rate from Bixby to local stations of the Southern Pacific which was higher than the rate to Alexandria, for shipments going beyond, plus an unfilled local rate from Alexandria to the destinations in question. The Waters-Pierce Oil Company took advantage of the combination rate instead of paying the joint through rate. The indictment charged that the joint rate was the legal rate. Notice was given of appeal to the United States Circuit Court of Appeals.

Safety Appliance Law Applies in Yards

The United States Circuit Court of Appeals for the fourth circuit, in an opinion by Judge Pritchard, deciding the case of the government against the Chesapeake & Ohio, and reversing the opinion of the district court for the eastern district of Virginia, holds that the safety-appliance acts apply to equipment used on side tracks and yard tracks as well as main lines; to hold otherwise would in a large measure give to the acts a narrow and artificial construction.

If defective equipment is discovered, and it can be repaired at the point of discovery, then it is incumbent upon the railroad company to repair the same as soon as the services of a repair man can be had; but if the defect is of such character that it can not be repaired at the point where discovered such car may be hauled to the nearest available point for that purpose, and must not be otherwise used between stations or in yards.

It appears that a car of corn received at Richmond in February, 1912, with an uncoupling lever out of order, was duly inspected and marked to be repaired; but repairs were delayed 12 days, and, in the meantime, the car was hauled to another yard, nearly a mile away. While there, it was on a track where it had to be moved frequently. It could have been repaired at once without inconvenience.

Railway Officers

Executive, Financial, Legal and Accounting

O. H. Bower, whose appointment as auditor of the Missouri, Kansas & Texas Railway of Texas, with headquarters at Dallas, Tex., has already been announced in these columns, was born



O. H. Bower

December 12, 1882, at Carrollton, Ark. He received a high school education and began railway work in August, 1898, as messenger boy for the Ft. Worth & Rio Grande at Comanche, Tex. From November, 1899, to June, 1900, he was station agent at Proctor, Tex., and the following year held a similar position at Blanket, Tex. He then went into the accounting department at Ft. Worth, where he remained for nearly eight years, filling various positions, including that of chief clerk. In March, 1909, he became special accountant to the auditor of the Ft. Worth & Denver City at Ft. Worth, and the following April was appointed secretary and auditor of the Wichita Valley Lines at Wichita Falls, Tex. He left the latter company in September, 1912, to go to the Missouri, Kansas & Texas at Dallas, Tex., and for one year was special accountant and chief clerk to the general manager, when he was made chief clerk to the auditor at St. Louis, Mo. On January 1 of this year Mr. Bower was made auditor of receipts of the Missouri, Kansas & Texas at Dallas, and one month later was made auditor of that road, as above noted.

Louis Charlton Fritch, chief engineer of the Chicago Great Western, with office at Chicago, has resigned to become assistant to the president of the Canadian Northern, with head-



L. C. Fritch

quarters at Toronto, Ont., effective April 1. Mr. Fritch was born in 1868, at Springfield, Ill., and took a course in civil engineering at the University of Cincinnati. Subsequently, he took a course in law and was admitted to the bar in Ohio. He began railway work in 1884, as supervisor's assistant on the Ohio & Mississippi. From January, 1886, to October, 1892, he was assistant engineer, and then to November, 1893, was engineer maintenance of way of the same road, succeeding to the position formerly filled by the chief engineer and master maintenance of way. He was also chief engineer in charge of construction of the Cincinnati & Bedford. On November 1, 1893, he was appointed division engineer of the Baltimore & Ohio Southwestern, which absorbed the Ohio & Mississippi. From September 1, 1899, to

November, 1902, he was superintendent of the Mississippi division of the same road. In February, 1904, he went to the Illinois Central at Chicago, and was engaged in special work until March 1, 1905, when he became assistant to general manager of the same road. He was appointed assistant to president in November, 1906, and from March 1, to November 15, 1909, was consulting engineer of the same road, and since that time has been chief engineer of the Chicago Great Western.

William A. Garrett having resigned as vice-president in charge of operation of the Chicago Great Western, to accept service with another company, that office is discontinued, effective March 16.

C. C. Huff, of Wichita Falls, Tex., has been appointed general attorney for the Missouri, Kansas & Texas of Texas, with headquarters at Dallas, Tex., succeeding Alexander S. Coke, resigned to engage in private practice.

Operating

Roldin A. Brown, trainmaster of the Illinois Central at Mattoon, Ill., has been appointed trainmaster of the Peoria and Mattoon districts, and John W. Bledsoe has been appointed trainmaster of the Effingham and Indianapolis districts, both with headquarters at Mattoon.

Kepler Johnson, trainmaster of the Chicago, Rock Island & Pacific at Haileyville, Okla., has been appointed trainmaster of the Southern division of the Chicago, Rock Island & Gulf, with headquarters at Fort Worth, Tex., succeeding H. Fairmon, who has been appointed trainmaster of the Oklahoma division, with office at El Reno, Okla.

J. A. Gordon, general superintendent of the Western district of the Pere Marquette, has been appointed general manager of the Chicago Great Western, with headquarters at Chicago, effective March 16. Mr.



J. A. Gordon

Gordon was born November 10, 1865, at Cincinnati, Ohio, and was graduated from St. Xavier College, Cincinnati, in 1884. He began railway work in the latter year and until 1887 was telegraph operator and clerk in the local freight office of the Cincinnati, Hamilton & Dayton at Cincinnati. The following year he spent traveling in Europe, returning to the Cincinnati, Hamilton & Dayton in 1889 as clerk in the auditing department. From 1890 to November, 1893, he was chief clerk to the superintendent of the Cincinnati division, and from the latter date to March, 1896, he was trainmaster of that division. He was then promoted to superintendent of the Wellston division, and in May, 1902, was transferred to the superintendency of the Southern division. In November, 1904, he was made general superintendent, resigning September, 1909, to become division superintendent of the Chicago Great Western, leaving the latter road in December, 1912, to go to the Pere Marquette as general superintendent at Detroit, Mich. When the Pere Marquette was divided into two districts in August, 1913, Mr. Gordon was made general superintendent of the Western district at Grand Rapids, Mich., which position he now resigns to return to the Chicago Great Western as general manager, as above noted.

Effective March 25, W. F. Watterson, superintendent of the Buffalo division of the New York, Chicago & St. Louis, at Buffalo, N. Y., will assume charge of the Fort Wayne division as superintendent, and E. J. Parrish, superintendent of the Fort Wayne division, at Ft. Wayne, Ind., will assume charge of the Buffalo division as superintendent. Division headquarters will remain as at present.

Traffic

A. H. Proudfoot has been appointed assistant general freight and passenger agent of the Liberty White, with office at McComb, Miss.

Claude P. Wilson has been appointed commercial agent of the Missouri, Oklahoma & Gulf at Houston, Tex., succeeding F. S. Sleight, transferred.

W. B. Morgan has been appointed commercial agent of the Central of Georgia, with office at Macon, Ga., succeeding D. F. Brady, resigned, effective February 20.

W. D. Belt, Jr., has been appointed traveling freight and passenger agent of the Chicago, Milwaukee & St. Paul, with headquarters at Dallas, Tex., succeeding J. B. Marshel, deceased.

J. C. Murray is appointed general freight agent, and Jay Kerr general passenger agent, of the Missouri & North Arkansas, with headquarters at Eureka Springs, Ark., assuming the duties heretofore performed by E. E. Smythe, traffic manager, who has been granted a leave of absence on account of ill health.

F. Zimmerman, who has been appointed general freight agent of the Lake Shore & Michigan Southern, with headquarters at Cleveland, Ohio, as was announced last week, was born July 26, 1866, at Portland, Maine. He graduated from the Chicago public schools in June, 1882, and subsequently until October, 1883, was office boy and clerk with the Green, Kankakee, Chicago & Louisville Southern and Southern Despatch Fast Freight Lines. He was then until April, 1887, clerk for the Chicago & Ohio River Pool, and from the latter date to February, 1890, rate and tariff clerk in the general freight department of the Louisville, New Albany & Chicago at Chicago. The following seven years Mr. Zimmerman was tariff and percentage clerk in the general freight department of the Michigan Central at Chicago and Detroit, Mich., and from April, 1897, to October, 1899, was chief clerk in the same department at the latter place. He was then appointed assistant general freight agent of that road at Buffalo, N. Y., and in July, 1900, was transferred to Chicago in a similar capacity, which position he held for over nine years, being appointed general freight agent of the Indiana Harbor Belt in November, 1909. In January, 1911, he was made also general freight agent of the Chicago, Indiana & Southern, and is now promoted to the position of general freight agent of the Lake Shore & Michigan Southern, as above noted.

H. M. Adams, freight traffic manager of the Western Pacific and the Denver & Rio Grande, has been appointed general traffic manager of the Missouri Pacific and the St. Louis, Iron Mountain & Southern, with headquarters at St. Louis, Mo., succeeding J. T. Hendricks, who has been appointed freight traffic manager of the Western Pacific, with headquarters at San Francisco, Cal. W. I. Jones, assistant to the general traffic manager of the Missouri Pacific and the St. Louis, Iron Mountain & Southern, has been appointed assistant to the vice-president, in charge of traffic of the four roads mentioned, with headquarters at St. Louis, Mo., vice M. C. Markham, assigned to other duties.

J. B. Nettle, general coal and ore agent of the Lake Shore & Michigan Southern and other New York Central Lines West of Buffalo, with office at Pittsburgh, Pa., has been appointed general freight agent of the Pittsburgh & Lake Erie, with headquarters at Pittsburgh, succeeding W. A. Newman, transferred, and the office of general coal and ore agent at Pittsburgh has been abolished and all matters pertaining to coal, coke and ore traffic will

hereafter be handled by H. M. Griggs, general coal and ore agent, whose headquarters will be moved from Chicago to Cleveland, Ohio. The office of M. D. Flanagan, general agent of the coal and ore department has been transferred from Cleveland to Pittsburgh.

Engineering and Rolling Stock

R. Preston, master mechanic of the Manitoba division of the Canadian Pacific at Winnipeg, Man., has been appointed assistant superintendent of motive power of the lines west, with headquarters at Winnipeg.

E. K. Mentzer has been appointed supervisor of bridges and buildings on the Boston division of the Boston & Albany, with headquarters at Worcester, Mass., succeeding W. P. Whitney, resigned.

C. G. Delo, engineer maintenance of way of the Chicago Great Western, at Chicago, has been appointed chief engineer, with headquarters at Chicago, effective at once, succeeding L. C. Fritch, resigned to become assistant to president of the Canadian Northern at Toronto, Ont. See Executive, Financial, Legal & Accounting.

A. M. Traugott has been appointed division engineer of the Third and Deepwater divisions of the Virginian Railway, with headquarters at Princeton, W. Va., succeeding B. T. Elmore, resigned, to become engineer of roadway and track, Interstate Commerce Commission, Division of Valuation, Eastern district, with office at Washington, D. C.

R. H. White, assistant signal engineer of the Louisville & Nashville, with headquarters at Louisville, Ky., has resigned to become editor of *The Signal Engineer* at Chicago. C. N. Beckner, signal supervisor of the Louisville, Cincinnati & Lexington division, Kentucky division and Louisville terminals, at Louisville, succeeds Mr. White, and F. H. Bagley, signal inspector at Louisville, takes the place of Mr. Beckner. Walter F. Hudson succeeds Mr. Bagley.

William Spencer Murray has been appointed consulting engineer of the New York, New Haven & Hartford, in charge of all engineering affecting electrical operation and construction, reporting to the president. Mr. Murray's headquarters are at New Haven, Conn. He was born on August 4, 1873, at the U. S. Naval Academy, Annapolis, Md., and graduated as an electrical engineer from Lehigh University in 1895. On April 1, 1905, he began railway work on the New York, New Haven & Hartford as electrical engineer, and had charge of the electrification of the New Haven Company's lines from Woodlawn to Stamford and New Rochelle to Harlem River, and later from Stamford to New Haven, which latter section is now nearing completion.

Wilbur M. Bosworth, whose appointment as mechanical engineer of the Louisville & Nashville, with headquarters at South Louisville, Ky., has been announced in these columns, was born on June 13, 1879, at Baltimore, Md., and graduated from the Baltimore Polytechnic Institute in 1898. He began railway work in July of the same year as a special apprentice on the Baltimore & Ohio at the Mt. Clare shops and three years later became draftsman at the same place. From January, 1906, to October, 1911, he was chief draftsman of the same road and then was appointed mechanical engineer of the Kansas City Southern, with headquarters at Pittsburg, Kan., leaving that position on March 1, to go to the Louisville & Nashville as mechanical engineer as above noted.

William W. Slater, who has been signal engineer of the Southern Pacific since February, 1885, has been retired under the pension rules of that company. He has been in railway service for 50 years, beginning railway work in February, 1864, as telegraph messenger for the Columbus, Piqua & Indiana. He was successively telegraph operator for the same road, telegraph operator and agent for the Union Pacific, paymaster's clerk of the Columbus, Chicago & Indiana Central, telegraph operator for the Western Union Telegraph Company and the Union Pacific Railroad, operator and agent for the Central Pacific, agent and operator for the Indianapolis, Bloomington & Western and the Peoria & Rock Island, and express messenger for various roads at Denver, until May, 1875. He was then until February, 1885, operator and train despatcher for the Central Pacific and the Southern Pacific, and on the latter date was made signal engineer of the Southern Pacific.

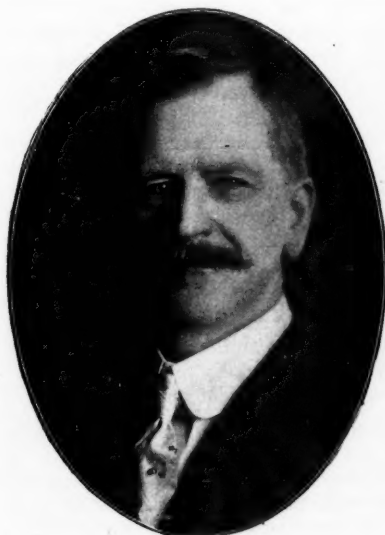


F. Zimmerman

J. K. Conner, whose appointment as chief engineer of the Lake Erie & Western and the Northern Ohio, with headquarters at Indianapolis, Ind., has been announced in these columns, was born April 12, 1871, at Wabash, Ind. He attended Rose Polytechnic Institute, 1889-1891, and the following four years was engaged in county and municipal work. He entered railway service June 15, 1895, and until 1899, was assistant engineer and supervisor of track of the Cleveland, Cincinnati, Chicago & St. Louis. He was then for one year assistant engineer of the Baltimore & Ohio Southwestern, and from 1900 to 1901, held a similar position with the New York Central & Hudson River, when he went to the Lake Shore & Michigan Southern as bridge draftsman and designer. Two years later he became connected with the Lake Erie, Alliance & Wheeling, and was successively resident and division engineer until 1905, when he returned to the Lake Shore & Michigan Southern as assistant engineer. In 1906 he became first assistant engineer of the Lake Erie & Western, which position he held until his recent appointment as chief engineer of the Lake Erie & Western and the Northern Ohio, as above noted.

Purchasing

Samuel F. Clark, whose appointment as purchasing agent of the Spokane, Portland & Seattle, has already been announced in these columns, commenced railway work April 20, 1896, in the general stores of the Great Northern at St. Paul, Minn., and for 14 years he was division and district storekeeper for that road at various points, resigning November 1, 1909, as storekeeper of the western district at Hillyard, Wash. Mr. Clark then went to the Spokane, Portland & Seattle, assuming charge of the general storehouse at Vancouver, Wash. He remained there until August 1, 1911, when he was transferred to the disbursements bureau of the accounting department of that road at Portland, Ore., serving in this capacity until February 1 when he was appointed general purchasing agent of the Hill lines, including the Spokane, Portland & Seattle, Oregon Electric, Oregon Trunk and United Railways and the Dallas, Portland & Astoria Navigation Company, with headquarters at Portland, Ore.



S. F. Clark

OBITUARY

John Y. Boyd, a former member of the Pennsylvania State Railroad Commission, died at his home in Harrisburg, March 9, at the age of 52.

W. B. Shepperd, traveling freight and passenger agent of the Ft. Worth & Denver City, with headquarters at Wichita Falls, Tex., died in that city on March 5, aged 30 years.

James W. Munn, assistant general passenger and ticket agent of the Chicago & North Western, with office at Chicago, died on March 13, at his residence in Chicago. Mr. Munn had been connected with the North Western since 1880, and had been assistant general passenger and ticket agent since September, 1912.

David O. Ives, traffic manager of the Boston Chamber of Commerce, died at his home in Boston, March 18, at the age of 63. Mr. Ives was for about 20 years in the railway service, having been general traffic manager of the Wabash and affiliated lines from August, 1905, to July, 1908. Before his connection with the Wabash he was for many years in the traffic department of the Burlington Lines in Iowa and Missouri.

Equipment and Supplies

LOCOMOTIVE BUILDING

THE DETROIT, TOLEDO & Ironton is in the market for motive power.

THE ILLINOIS CENTRAL has ordered 22 switching locomotives from the American Locomotive Company.

THE CITY OF NEWARK, N. J., has ordered one four-coupled locomotive from the Baldwin Locomotive Works.

THE GEORGIA SOUTHERN & FLORIDA has ordered 6 ten-wheel type locomotives from the Baldwin Locomotive Works.

THE JOHN L. ROPER LUMBER COMPANY, Norfolk, Va., has ordered one prairie type locomotive from the Baldwin Locomotive Works.

THE MASON COUNTY LOGGING COMPANY, Bordeaux, Wash., has ordered one mikado type locomotive from the Baldwin Locomotive Works.

THE ARKANSAS LUMBER COMPANY, Warren, Ark., has ordered one ten-wheel type locomotive from the Baldwin Locomotive Works.

THE J. R. BUCKWALTER LUMBER COMPANY, Union, Miss., has ordered one prairie type locomotive from the Baldwin Locomotive Works.

THE UNION PACIFIC is in the market for 25 Pacific, 15 mikado and 14 six-wheel switching locomotives. All these locomotives are to be equipped with superheaters.

THE SOUTHERN has ordered 13 six-wheel switching locomotives from the Lima Locomotive Corporation. These locomotives will have 20 by 26 in. cylinders; 51 in. driving wheels; a total weight in working order of 125,500 lb., and a tractive effort of 32,063 lb. The steam pressure will be 185 lb.

CAR BUILDING

THE GREAT NORTHERN is in the market for 100 fifty-foot express refrigerator cars.

THE ATLANTA & WEST POINT is said to have ordered 4 coaches from the American Car & Foundry Company. This item has not been confirmed.

THE ILLINOIS CENTRAL is in the market for 3,000 box cars, and has just ordered 500 40-ton refrigerator cars from the American Car & Foundry Company.

THE BESSEMER & LAKE ERIE, reported in an unconfirmed item in the *Railway Age Gazette* of last week as being in the market for cars, is in the market for 3,500 gondola and hopper cars.

THE ST. LOUIS SOUTHWESTERN, reported in an unconfirmed item in the *Railway Age Gazette* of last week as having ordered 2,000 cars from the American Car & Foundry Company, has ordered 1,500 box, 400 flat and 100 gondola cars from that company.

THE ATLANTIC COAST LINE, reported in the *Railway Age Gazette* of February 20, as being in the market for 15 passenger cars, has ordered that equipment of the American Car & Foundry Company. This road is also said to have ordered 17 passenger cars from the Barney & Smith Car Company; but the latter item has not been confirmed.

THE SOUTHERN, in addition to the 935 gondola cars recently ordered for the Virginia & Southwestern from the Pressed Steel Car Company, has ordered 1,250 box and 500 flat cars from the American Car & Foundry Company, 500 box cars from the Mount Vernon Car Manufacturing Company, and will build 1,175 box cars in its Lenoir shops.

IRON AND STEEL

THE CHICAGO JUNCTION has ordered 2,000 tons of rails from the Illinois Steel Company.

SIGNALING

The Missouri, Kansas & Texas and the Trinity & Brazos Valley are planning to install the block system on the line of the former road between Waxahachie and Dallas, 31 miles. The track is used jointly by the two roads.

The Wheeling & Lake Erie has ordered, for three telephone circuits, 76 G. R. S. selectors, made by the General Railway Signal Company, including bells, key cabinets, and other fixtures. One of these circuits is to be used for train despatching and two for messages.

The electro-pneumatic interlocking machine at South West Junction on the Pennsylvania Railroad was destroyed by fire on February 9. A new machine was ordered from the Union Switch & Signal Company on February 10, and it was shipped on February 26. This new machine had to be built complete, set up, tested, taken down, and packed, all of which was done in sixteen days. The machine has 21 levers for 79 signals and 30 levers for 48 switches and derails; or 51 working levers to control 127 operated units. It is a 59 lever frame.

JAPANESE RAILWAY CONCESSIONS IN CHINA.—It is reported that the Chinese government has granted to Japan the right to build about 1,250 miles of railway in Manchuria. The several lines included are as follows: Ssupingkai to Taonanfu, about 190 miles; Changchun to Taonanfu, about 150 miles; Taonanfu to Jehol, about 454 miles, or to Hulutao, about 364 miles; Kaiyuan to Kirin via Hailungcheng, about 220 miles, and from Kirin to the Korean frontier, about 212 miles. It is said that the construction work will be done by the South Manchuria Railway, with whose lines the proposed ones will be connected. The first line to be constructed will be that between Ssupingkai and Taonanfu. At the present time, the existing highway between these two points is 230 miles long. The railway will be but 190 miles in length. The estimated cost is about \$4,980,000, or \$25,896 per mile. There will be no great engineering difficulties or unusually expensive construction work with the exception of a bridge across the Liao river. Japan will probably have to negotiate a foreign loan for this work, and it is supposed that if a loan of \$9,960,000 can be negotiated under favorable conditions, the line between Kaiyuan and Hailungcheng will also be undertaken this year. The purchase of such materials as will be required from abroad will be made at Dairen, where the South Manchuria has its general offices.

RAILWAY CONSTRUCTION IN BOLIVIA.—There are now at least four lines of railway in Bolivia on which construction is, or soon will be, carried forward. The line from Potosi to Sucre, 90 miles in length, is not yet begun, but it is reported that the citizens of the latter place have raised about \$500,000 to assist the government in the work. The line from Oruro to Cochabamba, 130 miles long, has been two-thirds built, so that track is already laid as far as Arque. This line is to follow a devious course, because there is a mountain range of considerable importance between the two places. The Uyuni and La Quiaca line will link up the Argentine railway system with that of Bolivia and southern Peru. When it is completed, it will be possible to travel from Buenos Aires to Mollendo on the Pacific coast entirely by rail, except for the short trip across Lake Titicaca. The Antofagasta Railway has constructed about 56 miles of this line and will build about 45 or 50 miles more, completing the line as far as Tupiza. The contract for the remaining section has not yet been placed. The Machacamarc-Uncia line is a narrow gage line running through a rich mining region, and belongs to a Bolivian millionaire. The section from Machacamarc to Huanuni has been completed and the contract for the remaining portion of the line has been let.

EXPORTATION OF ENGLISH LOCOMOTIVES.—In January, 1914, English locomotive builders exported to other countries locomotives having a value of \$1,884,473. In 1913, the value of locomotives exported was \$1,022,692, and in 1912, \$833,784. The total for January of this year includes locomotives shipped to the Argentine Republic to the value of \$632,658.

COAL CONTRACTS FOR ITALIAN STATE RAILWAYS.—The Italian State Railways have recently placed orders for about 750,000 tons of coal for 1914 requirements at Cardiff, Wales. The price is said to be about \$4 per ton at Cardiff.

Supply Trade News

Colonel H. G. Prout has been elected president of the Union Switch & Signal Company.

Edward A. Hawks has been appointed special representative of the department of car equipment of the Dahlstrom Metallic Door Company, Jamestown, N. Y.

H. A. Rapelye has been appointed sales engineer in the Pittsburgh district for the Terry Steam Turbine Company, Hartford, Conn. He will have offices at 2123 Oliver building, Pittsburgh.

James C. Boyd, formerly chief engineer, has been elected vice-president of Westinghouse Church Kerr & Company, effective March 1. He will have charge of all the engineering and construction activities of the company.

The Esterline Company, Indianapolis, Ind., manufacturing curve drawing instruments, has recently opened additional branch offices in Salt Lake City, Utah; St. Louis, Mo.; New Orleans, La.; Minneapolis, Minn.; Calgary, Alberta, and Portland, Ore.

G. W. Alden, who for the past ten years has been with the McMyler-Interstate Company, Bedford, Ohio, has resigned from that company, to become western sales manager of the Ohio Locomotive Crane Company, Bucyrus, Ohio. He will have offices in the Fisher building, Chicago.

J. N. Kinney, who has been with the American Hoist & Derrick Company, St. Paul, Minn., for the past seven years, has resigned from that company, to become eastern sales manager of the Ohio Locomotive Crane Company, Bucyrus, Ohio. He will have offices at 30 Church street, New York.

Announcement is made of the organization and incorporation of Hodgkins & Co., with offices in the Great Northern building, Chicago, for the sale of locomotives and car specialties. The officers are as follows: Edward W. Hodgkins, president and treasurer, and Charles L. Mahoney, vice-president and secretary.

A. E. Heffelfinger has been appointed general representative in Cuba of the Richardson Scale Company, Passaic, N. J., builders of automatic weighing machinery. Mr. Heffelfinger was for a number of years with the American Car & Foundry Company. He will have headquarters at Cuba No. 76-Altos, Havana.

Westinghouse Church Kerr & Company, of Montreal and New York, have been retained by the Canadian Pacific as engineers to investigate the proposed electrification of the new double-track, 5½-mile Selkirk tunnel in British Columbia. The investigations will cover in general the type of system to be installed, the relative economies of steam and water power, and the effect of the electrification upon operating conditions.

American Steel Foundries

The net profits of the American Steel Foundries for the fiscal year ended December 31, 1913, according to the annual report just issued, were \$1,033,591, or 6 per cent. on the company's \$17,184,000 capital stock. The gross sales for the year were \$17,425,940, and the net earnings from operation were \$2,031,271. Miscellaneous income amounted to \$55,894, and interest charges to \$278,289. An appropriation was made from profits for bond redemption and debenture retirement amounting to \$456,358, which together with the profits on debentures purchased and retired, \$97,370, are carried to the balance sheet as appropriated profits and go to enhance the value of the capital stock. Repairs, maintenance and manufacturing expense amounted to \$1,315,859. Four quarterly dividends of 2 per cent., amounting to \$343,680, were paid during the year. In his statement to the stockholders President R. P. Lamont says in part: At no time during the year did all of the plants operate at full capacity. The volume of orders on hand at the beginning of the year was large, but new business steadily declined, and by the end of the year the plants were operating at less than 50 per cent. of the total capacity. By far the larger portion of your company's business

comes directly or indirectly from the railroads, and their purchases at the present time are much below normal, both for new equipment and for repairs. Unless the railroads get some relief in the near future in the matter of increased freight rates, the present year will not be a good one, for businesses depending upon them. Your plants and organization were never in better condition to handle a large volume of business, but there is very little business in sight at the present time. Anything that our stockholders can do toward helping to bring about a more favorable attitude toward the railroads will directly benefit your company.

TRADE PUBLICATIONS

PIPE.—The National Tube Company, Pittsburgh, has recently issued bulletin No. 11 C entitled "The History, Characteristics and the Advantages of National Pipe."

LUBRICATING APPLIANCES.—The Richardson Phoenix Company, Milwaukee, Wis., has used bulletin No. 57 to describe and illustrate the Phoenix Sight Flow Indicator.

DOUGLAS FIR.—The West Coast Lumber Manufacturers' Association, Tacoma, Wash., has issued a booklet on Douglas fir, describing its advantages in various kinds of building work.

CAR HEATING APPLIANCES.—The Gold Car Heating & Lighting Company, New York, has recently issued a bulletin describing the Gold electric thermostatic control of steam heating.

ELECTRIC FANS.—The Sprague Electric Works, of the General Electric Company, New York, has recently issued a 1914 catalog of electric fans, and bulletin No. 49,000, describing the company's portable ozonators.

PIPE AND PIPE FITTINGS.—The National Tube Company, Pittsburgh, Pa., has given in bulletin 19, recently issued, a complete list of its Kewanee products and the various kinds of National pipe and Shelby seamless steel tubing.

VALVES.—The National Tube Company, Pittsburgh, Pa., has recently issued a small booklet containing a list of the advantages of N. T. C. regrinding valves. The same company has also issued a bulletin describing National Pipe for drilling purposes.

PICKLING MACHINES.—The Mesta Machine Company, Pittsburgh, Pa., has issued bulletin M on the Mesta improved pickling machine, for the removal of scale and other substances from the surfaces of metals of any shape by the chemical action of acid.

CRANES.—The Northern Engineering Works, Detroit, Mich., has recently issued a condensed catalog compiled from the company's several bulletins illustrating the company's electric and hand power traveling cranes, electric and pneumatic hoists, overhead track systems, bucket handling cranes and railway cranes.

SULPHUR PRINTS.—The Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., has collected on one large sheet, sulphur prints of 12 standard open hearth rails and 12 sulphur prints of Titanium treated open hearth rails, which has just been issued. These prints show full sized sections of "A" rails, and are taken from bulletins 1-5, inclusive, recently issued by this company. They show the market effect of Titanium in reducing segregation.

DENVER & RIO GRANDE.—The annual review number of the "Railroad Red Book," published by the passenger department, has just made its appearance and contains a world of information of value to persons interested materially or otherwise in the Rocky mountain and Pacific coast regions. A feature of the issue is the publication of telegrams sent by the editors of the leading dailies of Denver, Colorado Springs, Pueblo, Santa Fe, Salt Lake City, Ogden, Wells, Elko, Winnemucca, Sacramento, Oakland and San Francisco in answer to a request for information as to the business outlook in the near future. There is an optimistic ring to every one of the telegrams, and the consensus of opinion is that the outlook for 1914 is very encouraging. The governors of Colorado, Utah, New Mexico, Nevada and California have contributed signed articles on the growth and development of their respective states during the year just passed.

Railway Construction

CENTRAL OF IOWA.—Incorporated in South Dakota, with \$5,000,000 capital, to build from Omaha, Neb., east to Des Moines, Iowa, about 140 miles. The incorporators include G. W. Adams, V. A. Hill and M. C. Harford, Council Bluffs, Iowa; W. E. Fix, Charles City, Iowa, and J. A. Holmes, Pierre, S. Dak.

CENTRAL OF TEXAS.—See Quanah, Seymour & Gulf.

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—New second main track between Sherman, Ky., and Dry Ridge, four miles, has just been put in service, completing a continuous double track section of 24.8 miles from Erlanger. Work is now progressing on second track from Dry Ridge to mile post 37, 5.4 miles. (November 14, p. 938.)

DEATH VALLEY.—See Tonopah & Tidewater.

EVANSVILLE, CHRISNEY & LYNNVILLE (Electric).—According to press reports announcement has been made by this company that work will be started soon on a line from Boonville, Ind., east to Chrisney, about 15 miles, also on a line from Boonville north to Lynnville, 12 miles. Surveys for both lines have been made, and it is understood that the work will be completed this year.

GEORGIA COAST & PIEDMONT.—The extension from Darien, Ga., south to Brunswick, 19 miles, was opened recently for passenger traffic.

GULF, FLORIDA & ALABAMA.—An officer writes that grading work on the extension from Broughton, Ala., to Pine Hill, is now in progress; James T. McCarthy & Co., Gainesville, Fla., are the general contractors for the grading. It is expected that this work will be completed during August, 1914. The building of this extension involves constructing a bridge over the Alabama river at or near Yellow Bluff, about 750 ft. long, comprising a draw span. Bids have not yet been asked, on either the substructure or super-structure, as the plans are not yet completed, but may be asked for shortly. The company expects to have the structure built before the end of this year. (November 28, p. 1048.)

ILLINOIS ROADS (Electric).—Surveys will be made, it is said, for a line from Kewanee, Ill., southeast via Bradford to Henry, about 35 miles. C. G. Lampman, Cedar Rapids, Iowa, may be addressed.

ILLINOIS TRACTION.—The proceeds of a recent mortgage will be used to extend the electric lines of the Omaha & Lincoln, it is said, between Omaha, Neb., and Lincoln. About 17 miles are now in operation between these places.

JANESVILLE & MADISON TRACTION.—An officer writes that contracts are to be let before next September to build from Beloit, Wis., north via Janesville to Edgerton, thence northwest via Stoughton, to Madison, about 50 miles. There will be a steel bridge 380 ft. long, also a 220-ft. viaduct and about 3,000 ft. of trestle work on the line. G. Pickhardt, president and chief engineer, Madison, Wis.

METOLIUS, PRINEVILLE & EASTERN.—Incorporated in the state of Washington with \$500,000 capital, and headquarters at Tenino, Wash. The plans call for building from Prineville, Ore., northwest to Metolius, about 32 miles. The incorporators include H. P. Scheel, Tacoma; W. G. Scheel and W. McArthur, Tenino.

MICHIGAN ROADS (Electric).—A company is to be incorporated in Michigan, it is said, with a capital of \$50,000, to build an electric line from Holly, Mich., northwest to Linden, about 8 miles. O. H. Lau, Detroit, Mich., is said to be back of the project.

MINNESOTA NORTHWESTERN ELECTRIC.—Bids are wanted until noon, April 2, 1914, for the grading, track laying and surfacing of 20 miles of a single track line. The company was organized last year in Minnesota, with \$500,000 capital to build a system of suburban lines out of Thief River Falls, Minn. Daniel Shaw, president; H. W. Protzeller, general manager, and G. H. Martz, chief engineer. The headquarters of the company are at Thief River Falls. (February 13, p. 345.)

NASHVILLE, CHATTANOOGA & ST. LOUIS.—An officer writes regarding the report that an extension is to be built from Paducah, Ky., that owing to the work on the bridge over the Ohio river at Metropolis, Ill., having been deferred, the N. C. & S. L. is considering the building of a branch from Paducah to a point opposite Metropolis, and establishing a transfer, but nothing definite has as yet been decided upon. Several years ago, the Paducah & Illinois Railroad was organized by a number of railroad companies to build a bridge at Metropolis, about ten miles below Paducah.

NEW YORK SUBWAYS.—The New York Public Service Commission, First district, has let the contract to the United States Realty & Improvement Company for \$1,837,726, for section No. 4 of the Seventh avenue subway, from Commerce street to Sixteenth street, in the borough of Manhattan. The contract includes building a local station at Christopher street and an express station at Fourteenth street. The contract for section No. 5, extending from Sixteenth street to Thirtieth street, originally awarded to the Canavan Brothers Company, has been assigned to the United States Realty & Improvement Company.

Bids were recently opened for the construction of section No. 6-A of Routes Nos. 4 and 38, of the new Seventh avenue subway in the borough of Manhattan, the Oscar Daniels Company being the lowest bidder at \$305,261.

NIAGARA, ST. CATHERINES & TORONTO (Electric).—The Lake Shore division has been opened for business from St. Catharines, Ont., to Niagara-on-the-Lake.

OHIO & PENNSYLVANIA BELT.—An officer writes that bids will be received in the near future to build a section of about 3 miles from Lowellville, Ohio, northwest to Haselton. On this section there will be two heavy cuts, also two undergrade crossings and one overhead crossing. The work includes constructing a retaining wall and a reinforced steel culvert. Robert Bentley, president; D. M. Wise, chief engineer, Youngstown, Ohio.

OMAHA & LINCOLN.—See Illinois Traction.

PACIFIC GREAT EASTERN.—This company, which started work some time ago on a line from Vancouver, B. C., north to the Grand Trunk Pacific at Fort George, about 350 miles, is planning to build an extension. A bill was recently introduced in the legislature providing for an extension northeasterly into the Peace river country, about 330 miles. (October 24, p. 806.)

PETALUMA & SANTA ROSA.—See San Francisco & Northern.

QUANAH, SEYMOUR & GULF.—Announcement is made by L. E. Walker, Austin, Tex., the principal promoter of this company, which was organized some time ago to build from Quanah, Tex., southeast to the port of Aransas Pass, that financial arrangements have been made. An amendment to the company's charter changing the name to the Central Railway of Texas, will soon be filed. The company has a capital of \$550,000 and proposes to start active construction work soon on the eastern section. The incorporators include L. E. Walker, Austin, C. G. Johnson, Rockport, G. W. Tyler and R. Y. Walker, both of Belton.

TENNESSEE ROADS.—According to press reports, plans are being made to build from Big Rock, Tenn., northeast via Weavers Store, to Lafayette, Ky., thence southeast via New Providence, Tenn., to Clarksville, about 32 miles. E. P. Martin, Big Rock, may be addressed.

TONOPAH & TIDEWATER.—The Death Valley, now building from Death Valley Junction, Cal., to borax mines owned by the Pacific Coast Borax Company, expects to have the work finished and the line in operation about July 1. (December 5, p. 1099.)

WAYCROSS & WESTERN.—An officer writes that a contract has been given to J. V. Nix, Milltown, Ga., to build an extension west to Milltown, about 4 miles. The work includes constructing a trestle over the Allapaha river.

RAILWAY STRUCTURES

MEMPHIS, TENN.—The Arkansas & Memphis Railway Bridge & Terminal Company has awarded a contract to the Virginia Bridge & Iron Company for 4,500 tons of steel for a viaduct approach to its bridge across the Mississippi river.

Railway Financial News

BOSTON & MAINE.—The plan for the separation of the Boston & Maine and the Maine Central, which is to be passed upon by the stockholders of these two companies on March 30, 1914, provides for the formation of a trust association—the Maine Railways Company—which will buy from the Boston & Maine its \$15,960,100 Maine Central stock at 95, and which will issue \$12,201,995 5-year notes to the Boston & Maine, and will issue \$3,000,000 stock, all of which is to go to the Maine Central. The Maine Central will issue against this stock \$3,000,000 30-day promissory notes which will be turned over to the Boston & Maine. In other words, the Maine Central will take the total stock of the Maine Railways Company; the Maine Railways Company will own the Maine Central stock and have outstanding its own securities which can be sold by the Boston & Maine to help pay the \$17,000,000 Boston & Maine notes maturing June 2, and \$10,000,000 Boston & Maine notes which matured February 2, 1914, and were in most cases extended for four months.

CHESAPEAKE & OHIO.—The special United States district court which ordered the dissolution of the combination of bituminous coal companies in Ohio has prescribed certain further particulars of this dissolution. The C. & O., the Hocking Valley and the Lake Shore & Michigan Southern are to dispose of their holdings of Sunday Creek Coal Company stock within 60 days. The Chesapeake & Ohio is ordered to sell its holdings of the Kanawha & Michigan, and these holdings must either be bought by the Lake Shore or both companies must sell their interests. The Kanawha & Michigan is now controlled jointly by the C. & O. and the Lake Shore. Mention has already been made in these columns of the intention of the Chesapeake & Ohio to build its own line to give it a connection with the Hocking Valley, which it now controls. This will give two competing north and south lines, one the Toledo & Ohio Central and K. & M., controlled by the Lake Shore, and the other the Hocking Valley, controlled by the C. & O. The court reserved decision on the petition of the government to have set aside the agreement whereby a part of the tracks of the Hocking and the Toledo & Ohio Central are used one for northbound traffic by both companies and the other for southbound traffic by both companies.

CHICAGO, BURLINGTON & QUINCY.—This company has sold through the First National Bank, New York, \$5,000,000 4 per cent. general mortgage bonds. The proceeds of the bond sale are to be used to reimburse the company for expenditures made for additions and betterments. The bonds were resold to Kean, Taylor & Company, New York.

CHICAGO, ROCK ISLAND & PACIFIC.—F. J. Wade, president of the Mercantile National Bank of St. Louis, has been added to the protective committee of the stockholders of the Rock Island Company.

The Railroad company 4 per cent. bondholders' committee has engaged E. W. McKenna, vice-president of the Chicago, Milwaukee & St. Paul, to make an examination and report on the condition of the Rock Island.

ERIE.—The New York Public Service Commission, Second district, has authorized the issue of \$13,500,000 3-year 5½ per cent. collateral notes, dated April 1, 1914. The commission has also authorized the issue of \$4,550,000 2½-year 5½ per cent. collateral notes to be dated October 1, 1914. The total \$18,050,000 notes are to be sold at not less than 98½, and the proceeds are to be used to pay off \$12,500,000 6 per cent. collateral notes, maturing April 8, to reimburse the company for expenditures for additions and betterments and for the payment of \$4,550,000 5 per cent. collateral notes, maturing October 1, 1914.

LEHIGH VALLEY.—G. F. Baer, president of the Philadelphia & Reading, has resigned as a director of the Lehigh Valley. M. L. Clothier has been elected a director to succeed Mr. Baer.